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DRAGONFLY FAUNA OF SRI LANKA

DISTRIBUTION AND BIOLOGY, WITH
THREAT STATUS OF ITS ENDEMIC

DRAGONFLY FAUNA OF SRI LANKA: distribution and biology, with threat status of its endemics

**Matjaž Bedjanič, Karen Conniff,
Nancy van der Poorten & Ali Šalamun**

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CONTENTS

| | |
|---|-----|
| PREFACE | 5 |
| ACKNOWLEDGEMENTS | 7 |
| CHAPTER 1. Outline of geography, ecology and biodiversity of Sri Lanka | 10 |
| CHAPTER 2. Biology, diversity and conservation of the dragonflies of Sri Lanka | 15 |
| CHAPTER 3. Dragonfly habitats in Sri Lanka | 20 |
| CHAPTER 4. Odonatology in Sri Lanka | 25 |
| CHAPTER 5. List of the dragonfly species of Sri Lanka | 30 |
| CHAPTER 6. Distribution and biology of the dragonflies of Sri Lanka: methodology, summary of results and species' accounts | 34 |
| CHAPTER 7. IUCN Red List assessments of globally threatened endemic dragonfly species of Sri Lanka | 258 |
| CHAPTER 8. Conservation priorities and recommendations | 267 |
| CHAPTER 9. Research priorities and recommendations | 270 |
| CHAPTER 10. Odonatological bibliography of Sri Lanka | 274 |
| APPENDIX 1: Overview of dragonfly species per district and province | 284 |
| APPENDIX 2: Faunistic records of globally threatened endemic dragonfly species of Sri Lanka | 291 |
| APPENDIX 3: Photographic index and supplementary material | 306 |
| INDEX | 318 |



PREFACE

“Why of all places Sri Lanka and why exactly dragonflies?”... The answer to both of these very often heard questions is actually simple and natural. Since Marco Polo declared Sri Lanka ‘the finest island of its size in the world’ almost 800 years ago, this small island has enraptured everyone at first glance. It has been known historically as the Pearl of the Indian Ocean, India’s Teardrop, Serendib, Taprobane and Ceylon. It has a rich history and culture, friendly people, tea-covered hills, scents of spices, gems, sandy beaches and lush green tropical nature with diverse flora and fauna. Small colourful parts of the island’s fauna are dragonflies, an ancient order of strikingly beautiful insects, called Odonata, which instantly attract attention with their amazing flight skills and bright colours. It was a shared admiration for this tropical paradise at the southeastern tip of the Indian subcontinent and its dragonfly fauna that brought together authors from a small European country Slovenia, USA/Nepal and Canada/Sri Lanka to join their efforts in a book devoted to the flying pearls of the Sri Lankan streams, rivers, ponds and marshes.

It will be surprising to many that the odonatological research of the island of Sri Lanka has very old roots. Some of the most prominent odonatological researchers of the past 150 years, such as H. A. HAGEN, E. DE SELYS – LONGCHAMPS, W. F. KIRBY, F. F. LAIDLAW, F. C. FRASER and M. A. LIEFTINCK, revised material from the island and described numerous new dragonfly species. However, despite their valuable contributions and despite having a book—*The Dragonflies of Sri Lanka* by T. DE FONSEKA—devoted to the subject at the break

of the millennium, the knowledge of the dragonfly fauna of Sri Lanka was fragmented and incomplete.

At present, 124 species of dragonflies are known from the island, including some new endemic species in the process of description. The level of endemism is extraordinary—almost half of the dragonfly fauna is confined to the island. The families Chlorocyphidae, Euphaeidae, Protoneuridae, Platystictidae, Gomphidae and Corduliidae consist of almost exclusively endemic taxa, thus making the dragonfly fauna of Sri Lanka an exceptionally interesting subject for studies in zoogeography, biodiversity, phylogeny and ecology.

Unfortunately, this natural wealth and diversity is highly endangered by the constantly increasing human pressures on their habitats, starting with the ruthless colonial destruction of the natural forests in the middle of the 19th century which lasted for over a hundred years. This destruction has unfortunately continued into the recent decades of Sri Lanka’s independence with almost the same careless pace. As a result, similar to many other groups of animals and plants, over two-thirds of the endemic dragonfly species are recognized as being endangered on a global scale, with this sombre fact raising great conservation concerns.

The present publication is a result of almost two decades of work by the authors. It reflects their deep admiration and affection for the dragonflies of Sri Lanka as well as their strong desire to contribute to a better understanding of the occurrence, biology and behaviour of the dragonfly fauna, to raise awareness and concern over its threatened status, and to help in its long-term conservation.

Thus, the “*Dragonfly fauna of Sri Lanka: distribution and biology, with threat status of its endemics*” has been compiled and written with the following aims: (i) to summarize all available data and knowledge on the distribution, taxonomy and biology of the dragonflies of Sri Lanka, (ii) to point out gaps in this knowledge, (iii) to assess and document the threat status of all dragonfly species and subspecies endemic to Sri Lanka and (iv) to promote interest in odonatological topics among nature conservationists, researchers and students in Sri Lanka. Without their support in the field and other forms of cooperation, progress in studying and preserving the remarkable dragonfly fauna of Sri Lanka will be hard to achieve.

This odonatological publication is the first of its kind in South and Southeast Asia and even among the first in the tropics globally. Though it brings together a substantial amount of valuable old and new information on the dragonfly fauna of Sri Lanka, our knowledge is still fragmentary. Many gaps remain and many new questions have emerged. With the groundwork firmly set, field activities and surveys need to be carried out in order to advance odonatology in Sri Lanka to a higher level. Hopefully, future odonatological research and conservation projects will find the much needed understanding and support from the relevant authorities and organizations in Sri Lanka and abroad.

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Chapter 1

OUTLINE OF GEOGRAPHY, ECOLOGY AND BIODIVERSITY OF SRI LANKA

The island of Sri Lanka, formerly Ceylon, has an area of 65,610 km² and is a detached part of the continental Indian plateau of ancient crystalline rocks. It lies in the Indian Ocean, southwest of the Bay of Bengal, between longitudes E 79° 39' and 81° 53' and latitudes N 5° 54' and 9° 52'. Sri Lanka is separated from the Indian subcontinent by the shallow Palk Strait, which is 15 metres deep at the most, and by the Gulf of Mannar. In-between is a remnant of the former land connection forming a chain of limestone shoals, known as Adam's Bridge, parts of which remain above sea level.

The geological origin of Sri Lanka belongs to the ancient southern hemisphere landmass, Gondwana. Well over 100 million years ago, the the Indian plate, comprising present-day India and Sri Lanka, broke away and began its northwards drift. It started to collide with the Eurasian plate about 50 million years ago, inducing a dramatic uplift of the Himalaya mountains and the Tibetan Plateau. By approximately 30 million years ago, due to the continuous northward movement and counter-clockwise rotation of the Indian plate, India and Sri Lanka were close to their current geographic position (CHATTERJEE et al., 2013). The land bridge between them submerged about 20 million years ago. However, due to fluctuations in sea level, the connection between India and Sri Lanka has been re-established and broken repeatedly. Especially during the Pleistocene glaciations, Sri Lanka was intermittently and for extended periods connected to mainland India through the Palk Strait, until a rise in sea level created the present separation approximately 10,000 years ago.

Topographically, Sri Lanka can be divided into

three peneplains. The highest peneplain comprises the Central Highlands, a complex of plateaus, mountain chains, massifs and basins that range from 1,000–2,500 metres elevation. These highlands are surrounded by the middle elevation hills of the second peneplain, which rise from 300–1,000



Map of Sri Lanka with major cities, geographical position and topography.

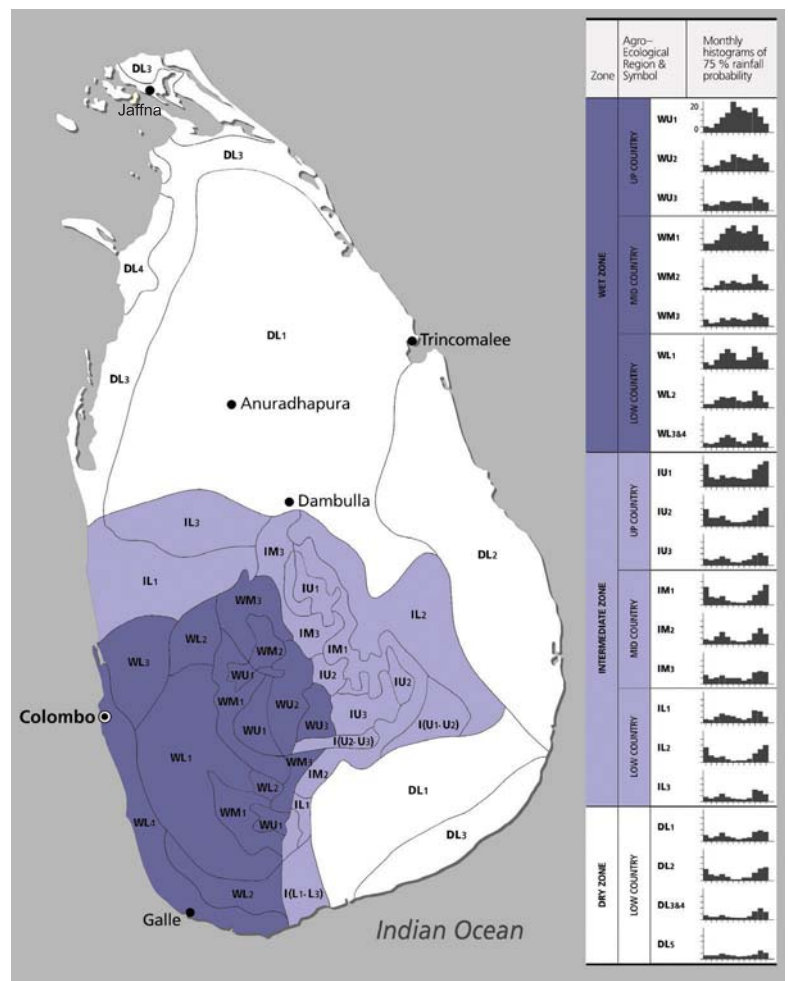
metres elevation. Surrounding this are the vast plains of the first peneplain, which surround the island and extend inland from the coastal lowlands, rising from sea level to 300 metres elevation (DISSANAYAKE, 1984).

The island lies in the equatorial belt and its climate is tropical. The average daily temperatures are high, around 27°C in the coastal lowlands, and fluctuate only slightly throughout the year. The hills and mountains are considerably cooler—daily means are about 15°C at 2,000 metres elevation, with minimum temperatures well below 10°C.

Due to varied topography and the strong influence of monsoon winds from the Indian Ocean and the Bay of Bengal, the amount and distribution of rainfall in Sri Lanka varies widely. Two monsoon events—the southwest monsoon from May to September, and the northeast monsoon from December to February—bring rain to different parts of the island. The inter-monsoonal periods in March-April as well as in October-November, when the winds are changing, also bring significant precipitation with thunder and lightning to certain parts of the country.

Based on rainfall, the island is commonly divided into three climatic zones—dry, intermediate and wet. The wet zone occupies the central and southwestern parts of the island and receives the major portion of its rain during the southwest monsoon. The northeast monsoon affects mainly the northern, eastern and southeastern lowlands of the dry zone and parts of the adjoining central highlands. The intermediate zone receives moderate amounts of rain from both monsoons. The average annual rainfall varies from over 5,000 mm in the southwestern part of the island to less than 1,000 mm on the northwest and southeast coasts. Because of strong evaporation and only seasonal rainfall, a considerable part of the dry zone suffers from drought and depends on artificial water storage for cultivation.

Despite its small size, Sri Lanka has very rich ecosystem diversity because of its complex geological



Agro-ecological regions of Sri Lanka (redrawn after Dissanayake, 1984). The most variable climatic factor on the island, a consequence of monsoons and varied topography, is the quantity and seasonal distribution of rainfall. On this basis, Sri Lanka is divided into three zones—wet, intermediate and dry, which greatly differ in ecology and biodiversity.

history, its topographic and climatic heterogeneity as well as the coastal influence. However, the diversity of habitats and species across the country is disproportionate. The dry zone with its numerous water reservoirs is famous for its large fauna, most notably elephants, leopards and water birds. Its tropical dry mixed evergreen forests currently represent 16% of the island's total land area and more than half of the island's natural forest cover. But in general the level of endemism in the dry zone is low (GUNATILLEKE et al., 2008).

The wet zone, on the other hand, represents



Tropical rainforests in Sri Lanka's wet zone are the cradle of exceptional biodiversity, harbouring most of the island's endemics—species that live only here and nowhere else on the planet. Sinharaja Forest is one of the few remaining primary forests in the southwestern part of Sri Lanka and is protected as a Biosphere Reserve under UNESCO.

barely one-third of the island's land surface, yet a very high proportion of endemic plants and animals live here. In particular, the remaining patches of lowland rain forest, together with tropical submontane and montane forests, are exceptionally rich in biodiversity and endemism even though they comprise only about 3% of the island's total land area. They harbour nearly all the country's endemic woody flora, at least half of the inventoried endemic fauna, and many endemic genera.

This very high diversity of fauna and flora, and especially the number of endemic taxa, has deservedly been recognised. In 1990, southwestern Sri Lanka was classified as one of the global biodiversity hotspots (MYERS, 1990). In subsequent biodiversity analyses it was merged with the Western Ghats of India under the "Western Ghats and Sri Lanka" hotspot, which is recognized by having one of the highest species density per surface area for

flowering plants, amphibians, reptiles and mammals in Asia (MYERS et al., 2000; MITTERMEIER et al., 2000). In addition, "Sri Lankan Moist Forests" and "Southwestern Sri Lanka Rivers and Streams" are included in the WWF's prestigious Global 200 list of the Earth's biologically most irreplaceable or distinct habitats (OLSON et al., 2000).

Due to similarities in their geology, climate, evolutionary history and biodiversity, Sri Lanka and the Western Ghats of India have often been considered as a single biogeographic unit (e.g. MYERS et al., 2000). However, BOSSUYT et al. (2004) and other authors showed that, for some faunal groups, the biotic interchange between mainland India and the island has been much more limited in the past than assumed. An analysis of the molecular phylogenies of the groups studied showed that the taxa in Sri Lanka are largely distinct from those of the Indian mainland despite several extended periods of land

connections during the past 500,000 years. These groups not only exhibit a high degree of species endemism but also contain endemic taxa that represent very old branches or distinct clades of the tree of life.

Unfortunately, this natural wealth is already compromised and Sri Lanka's remarkable diversity is highly endangered. It all started with the ruthless colonial destruction of the wet zone's natural forests in the middle of the 19th century, which lasted under British jurisdiction for over a hundred years. At first, the forested hill slopes in the centre of the island were extensively clear-cut for coffee plantations, which were abandoned due to a fungal disease. These plantations were replaced in the second half of the 19th century by cinchona, rubber and the vast tea plantations that largely prevail today (PETHIYAGODA,

2007). Constantly increasing human pressures and unsustainable practices unfortunately continued into the recent decades of Sri Lanka's independence. In the last 60 years the population of Sri Lanka has tripled in size to over 21 million inhabitants. The biologically richest southwestern third of the island, where so much of the island's endemic fauna and flora are found, supports at the same time nearly 70% of the country's human population with a population density of close to 700 people/km² (PETHIYAGODA, 2005; IUCN SRI LANKA & MINISTRY OF ENVIRONMENT AND NATURAL RESOURCES, 2007).

The sombre result is not surprising—additional habitat loss and fragmentation, coupled with water pollution, unsustainable water extraction, soil erosion, overuse of fertilizers and pesticides, and general environmental pollution, to name just the



A common panorama in the central part of Sri Lanka where the hills east of Nuwara Eliya have been converted into vast tea plantations and almost no natural forest is left.

most immediate threats, is ongoing. The destruction and encroachment of the natural forests in the wet zone of Sri Lanka, which are the cradle of the island's biodiversity, thus spans uninterruptedly for over 150 years and continues today.

What are the prospects for the future? There is some hope, reflected from the past. Indeed, the world's first wildlife sanctuary is believed to have been established in Sri Lanka. More than 2,000 years ago, in the third century BC, King Devanampiyathissa designated Mihintale and the surrounding jungle as a sanctuary for wildlife. The recent protected area network under the jurisdiction of the Department of Wildlife Conservation and the Forest Department extends over more than 18% of the island's land area and comprises over 500 sites. This includes several management categories, from the smaller strict natural reserves and forest reserves, to wildlife sanctuaries and national parks. Some of these are recognized internationally as Man and Biosphere reserves, declared under the UNESCO World Heritage Convention and some as Wetlands

of international importance declared under the Ramsar Convention (IUCN SRI LANKA & MINISTRY OF ENVIRONMENT AND NATURAL RESOURCES, 2007; DELA, 2009; ERDELEN, 2012). Although the proportion of protected areas in Sri Lanka is relatively high, they are located mainly in the dry zone lowlands because of the historically strong attachment of official nature conservation towards elephants, leopards and other large animals as well as birds.

Today, in a largely changed world and society, in order to succeed in saving the remarkable biodiversity of Sri Lanka, sustainable uses need to be encouraged in everyday life, and merged with enthusiasm, raised public awareness and modern concepts of nature conservation. One of the basic prerequisites for saving this biodiversity is better knowledge of the island's flora and fauna. Our knowledge is still largely insufficient for many groups and can only be accumulated through intensive, basic faunistic and floristic exploration and fieldwork (PETHIYAGODA, 2005; MOE, 2012).

Chapter 2

BIOLOGY, DIVERSITY AND CONSERVATION OF THE DRAGONFLIES OF SRI LANKA

Dragonflies are among the most spectacular of insects. They instantly attract attention with their beautiful colours and amazing flight skills. But a closer look reveals their strikingly interesting life history—they are stretched between water and air, with a predatory way of life, unique mating behaviours and many other unexpected traits. The various adaptations of dragonflies have allowed them to survive successfully from ancient times until today. Their fossil record dates back to the Permian era 230–280 million years ago and their ancestors shared the planet with dinosaurs. These ancient fliers were like small birds of prey in size, with wingspans of up to 45 centimetres or more; the wingspan of today's dragonflies rarely exceeds ten centimetres. Despite their bright colours, strong flight, powerful jaws and considerable size by insect standards, these stunning creatures are completely harmless to humans—they don't sting, and are not poisonous or noxious in any way.

The common English expression “dragonflies” actually comprises all three extant suborders of the order Odonata, which is one of the smaller among insects, numbering around 6,000 species worldwide. The suborder Anisozygoptera holds only the extant genus *Epiophlebia*, which is distributed in Japan, China and the Himalayan region. The representatives of the two other far more speciose suborders, Zygoptera and Anisoptera, are found worldwide including the wetlands and rivers of Sri Lanka. At present, 124 species are known from the island.

Damselflies, suborder Zygoptera, are generally small and delicate with a hammer-shaped head with compound eyes that are well-separated, a match-like slender abdomen and similarly-shaped narrow wings, which at rest are folded over the abdomen or slightly spread. The second suborder, Anisoptera, are referred to as true dragonflies. They are generally larger and more robustly built and their large compound eyes cover almost the entire head. The hind wings are expanded at the base, the venation and shape of the fore- and hind wings differ substantially and the wings are held broadly opened.

Although the basic systematic division of the Order is simple, the determination of dragonflies to the genus or species level is more complex. It demands a wider knowledge of dragonfly morphology and the inspection of minute structural details. Though the colours and markings of the wings and the body are easy to observe, they can vary considerably depending on the insect's sex and age. Mature males and females of the same species often look very different, the males usually being more conspicuous and brightly coloured. However, freshly emerged and juvenile males often resemble the females in colouration. Although not aimed and designed as an identification guide, a fair extent of this diversity is described in the text and images of this book.

Biology and various other aspects of the life of a dragonfly are a vast subject to which separate books are devoted. Since the present publication is directed



Endemic *Pseudagrion rubriceps ceylonicum* is a damselfly, suborder Zygoptera (left). A mating pair is depicted: the male holds the female firmly by the prothorax with its anal appendages, forming a tandem position, one of the peculiar, characteristic mating poses. *Rhyothemis triangularis* belongs to the true dragonflies, suborder Anisoptera (top).

towards the distribution, biology and threat status of individual species, only a general summary of key facts from their life history and behaviour is offered here.

Dragonflies belong to both water and air. Beautifully coloured adult winged insects are masters of the air and can be easily observed in numbers along rivers, streams, paddy fields, marshes, pools and lakes. They are rather short-lived, generally surviving only a few weeks or months. The longer part of their insect life is spent in the water. Here, their larvae develop from eggs, which are laid by females in plant tissue or are dropped freely into the water depending on the species.

The first larval instar is very small, but being a voracious eater and very successful predator, the larva sheds its skin several times underwater, which allows it to grow and become proportionally larger. Larvae feed on almost anything living that they can

catch, including mosquito larvae and other dragonfly larvae. Larger larvae occasionally even catch a small fish.

When fully grown, the swollen wing pads clearly declare that the larva—actually already a pharate adult within the larval skin—is ready to leave its aquatic environment and emerge. It climbs out of the water and, usually in less than an hour, emerges from its tight larval casing, directly as a winged adult. It quickly expands its soft wings and then flies away to the shelter of trees and bushes. Only subsequently does it develop its mature colours. The only vestige of its long underwater life and the proof of its successful development is an empty larval skin at the waterside, called an exuvia.

After transforming into a beautiful winged adult, it remains an aggressive predator, preying on other flying insects, sometimes even in a cannibalistic manner, eating dragonflies of similar size. During the

pre-reproductive period and while feeding, the adults are often encountered far from their breeding sites. Their attractive colouration fully develops only after several days. Male dragonflies are usually found on



The emergence of a dragonfly is one of the most interesting acts in nature. In the morning, the larva of the endemic *Burmagomphus pyramidalis sinuatus* leaves its watery habitat. Its tight larval casing splits on the back and within minutes a winged adult insect emerges and climbs from its still wet exuvia. Within half an hour it unfolds and stretches its wings and body and a beautiful creature is ready for its maiden flight into the new element.

or near water environments where, besides feeding, their main occupation seems to be an active search for a mate. Females are usually seen at the water only when they are ready to mate or lay eggs. Otherwise, they dwell and feed nearby to avoid the persistent mating attempts of the males.

But when a female is ready to mate, the vigilant male clasps it by the head or prothorax with its anal appendages, forming a tandem pair. The actual mode of copulation is peculiar and unique: the primary sexual organs of the male and female, which are situated at the end of the abdomen, do not meet through direct contact. Instead, the male transfers its sperm to specialised secondary genitalia underneath the second abdominal segment. The female, still securely held by the male's anal appendages, then bends its abdomen and genitalia to contact the secondary genitalia of the male, and is thus inseminated indirectly. During this act the partners, who are said to be "in copula", are joined in a heart-shaped configuration, also called the wheel position. Having received the sperm, the female stores it in a special structure, and fertilizes the eggs only when they are ready to be laid. If another male succeeds in copulating with an already inseminated female, it removes the sperm of the first rival and replaces it with its own in the selfish hope that the new brood from the eggs to be laid will carry its genes.

Additional details regarding biology, behaviour and ecology of dragonflies can be found in the book *The Dragonflies of Sri Lanka* by DE FONSEKA (2000), and in the most comprehensive book on the subject to date titled *Dragonflies: Behaviour and Ecology of Odonata* by CORBET (1999).

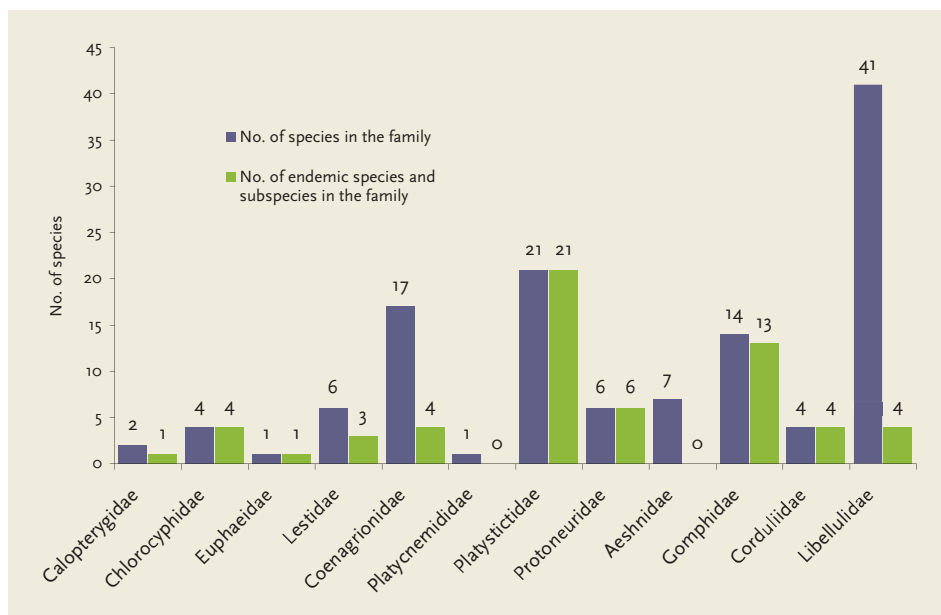
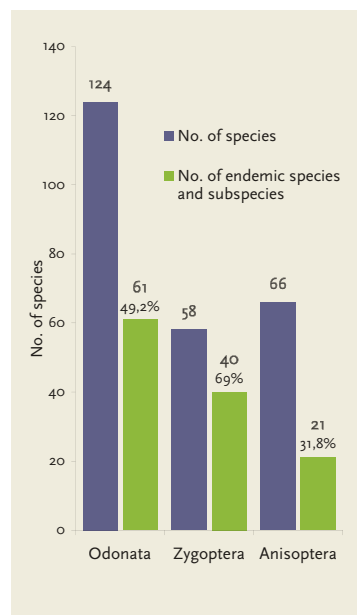
To date, 124 species of dragonflies have been recorded from the island—58 species and subspecies belong to the suborder Zygoptera and 66 to the suborder Anisoptera. In comparison to other regions in Southeast Asia, the species diversity in Sri Lanka is moderate. For example, countries such as Singapore and Hong Kong, which have a much smaller land area and which are odonatologically well explored, support a comparable number of species (TANG et al., 2010; TAM et al., 2011). The neighbouring Indian state of Kerala has recorded 147 dragonfly species (KIRAN & RAJU, 2011), while India as a whole, mainly due to its vast size and varied habitats, has over

460 species on its odonate checklist (SUBRAMANIAN, 2009a).

However, it is the extent of endemism that makes the dragonfly fauna of Sri Lanka unique—an astonishing 49.2% of the odonate fauna, or 61 taxa, are endemic. This includes four new endemic species that are in the process of description. The families Chlorocyphidae, Euphaeidae, Protoneuridae, Platystictidae, Gomphidae and Corduliidae consist

almost exclusively of endemic taxa, thus making the dragonfly fauna of Sri Lanka an exceptionally interesting subject for studies in zoogeography, biodiversity, phylogeny and ecology. Sri Lanka has deservedly been listed among the richest regions for dragonfly endemics globally (KALKMAN et al., 2008).

Overall in Asia, only a few much larger areas belong to the same prestigious category. For example, Borneo has over 270 dragonfly species, 46% of



Species diversity and endemism of the dragonfly fauna of Sri Lanka at the order, suborder and family level. The total number of dragonfly taxa is presented in the blue columns and the number of endemic species and subspecies in the green columns.

which are endemic; Sulawesi has over 125 species, 44% of which are endemic; the Western Ghats has about 180 dragonfly species, nearly 40% of which are endemic (KALKMAN et al., 2008; SUBRAMANIAN et al., 2011; SUBRAMANIAN et al., 2013). Sri Lanka's case is even more notable since almost 70% of the endemic dragonfly taxa are found in the southwestern and central parts of the island, in a limited area of land that is only around 20,000 km² in extent. Thus, as stated recently for the remarkable diversity within the family Platystictidae (BEDJANIĆ, 2010), the central and southwestern areas of Sri Lanka can legitimately be classified among the global odonatological “hotspots”.

Having such a small region blessed with such rich biodiversity, but packed together with a record-breaking human population density and all possible

environmental pressures, clearly raises great nature conservation concerns. The dragonflies of Sri Lanka are not an exception since many species inhabit very fragile and vanishing wetland habitats that are crucial for their survival. In different stages of their lives, dragonflies occur both in terrestrial and freshwater habitats and are sensitive to disturbances in both. While habitat selection by adult insects strongly depends on vegetation structure, their larvae develop in water and are dependant on water quality and aquatic habitat structure. Dragonflies can serve as reliable indicators of the quality of wetland habitats and their high species diversity clearly mirrors favourable conservation status of the wider wetland ecosystems. Therefore, they are often called the “guardians of the watershed”.

The first list of endangered dragonfly species was compiled in the publication *The 1999 List of Threatened Fauna and Flora of Sri Lanka* (IUCN SRI LANKA, 2000) and more or less the same data were presented in *A Comparison of the Conservation and Legal Status of the Fauna and Flora of Sri Lanka* (IUCN SRI LANKA, 2003). The conservation status of Sri Lankan dragonflies was more comprehensively reviewed by BEDJANIĆ (2004, 2006b), who evaluated more than 80% of the island's endemics as threatened. Consequently, 20 of the most endangered endemic species were assessed in detail and included on the IUCN Global Red List of Threatened Species (BEDJANIĆ, 2006a; 2009b). Additionally, a list of endangered dragonfly species was included in the Red List prepared by IUCN Sri Lanka in 2007 (IUCN SRI LANKA & MINISTRY OF ENVIRONMENT AND NATURAL RESOURCES, 2007). In the recent publication of the Ministry of Environment, *The National Red List 2012 of Sri Lanka*, 61 dragonfly species were listed as threatened on the regional level according to IUCN criteria and categories (VAN DER POORTEN & CONNIFF, 2012). Based on a more comprehensive dataset, a detailed assessment of the threat status of all endemic species and subspecies according to global IUCN criteria is provided under the individual species accounts in CHAPTER 6 and summarized in CHAPTER 7.

Legal protection of odonates has been in place since 1970: a blanket protection of invertebrates in Protected Areas under the jurisdiction of the Department of Wildlife Conservation was mandated under the amended Flora and Fauna Protection Ordinance (*Consolidated version of Ordinance No. 2 of 1937 as amended last by Act No. 1 of 1970*). In 2009, all Odonata were explicitly listed as protected under Schedule VII of the *Fauna and Flora Protection (Amendment) Act, No. 22 of 2009*. However, in the case of invertebrates, it is not clear if legal protection of all species, regardless of their threat status, is effective, particularly without provisions for habitat conservation.

Encroachment into and destruction of habitats have been and remain the only real and serious threats to the long-term survival of the island's remarkable dragonfly fauna. Therefore, sustainable landscape management that includes conservation and restor-

ation of habitats is clearly the first imperative for the future. However, better knowledge of the taxonomy, distribution, behaviour and resource requirements of dragonfly species and subspecies in all stages of their life history will be needed for future assessments of their threat status and in order to develop specific conservation guidelines at the local level. Faunistic and taxonomic research, along with ecological and conservation studies, thus remain the priority odonatological tasks for years to come and should be supported by all possible means.



In Sri Lanka, the damselfly family Platystictidae is represented by over 20 endemic jungle dwelling species. Such diversity is remarkable on a global scale. Unfortunately, as is the case with *Drepanosticta hiliaris*, pictured here, many are endangered and survive only in the small remaining pockets of their original habitats.

Chapter 3

DRAGONFLY HABITATS IN SRI LANKA

Water is central to the life of a dragonfly—adults are usually found near the water sources in which they breed, females generally lay their eggs in water, and the larvae develop in this medium. Although surrounded by ocean, the dragonflies of Sri Lanka are bound to live in and near freshwater; larvae of only a few species tolerate brackish water in coastal lagoons and river estuaries.

Though a small island, Sri Lanka is rich in water resources. However, as outlined in CHAPTER 1, due to varied topography and climate, the water wealth is unevenly distributed. The northern, eastern and southeastern parts of the island are very dry for at least five months of the year. On the other hand, the hills and mountains of central and southwestern Sri Lanka receive precipitation throughout the year—seeps and trickles are everywhere and almost every valley has a lively running rivulet or stream.

The habitats available to dragonflies are thus very diverse. In the lowlands, there are a variety of ponds, marshes, lagoons, rivers and streams as well as reservoirs, rice fields, and irrigation channels. In the hilly regions the assortment of suitable dragonfly habitats is different—stagnant waters are in the minority but there is a rich network of rivers, rivulets, streams, waterfalls, springs, seeps and marshy wet depressions. These different types of habitats, together with their characteristic dragonfly fauna, are briefly outlined in the following lines.

Sri Lanka has no natural lakes though it has many small permanent or seasonal water bodies. One class, called villus, are small natural floodplain lakes that are shallow, seasonal, and rain-fed. Villus are found in the east along the Mahaveli River system and in the northwest in Wilpattu National

Park, which also has brackish villus. There is little free water in a villu, but it has a long shallow edge that provides a good habitat for several species of odonates including *Crocothemis s. servilia* and *Brachythemis contaminata*. Villus are also attractive to crocodiles so one approaches the odonates there with care!

Man-made reservoirs, called tanks, are home to many dragonfly species. The island has over 10,000 tanks, some of which were built over 2000 years ago. They cover 170,000 hectares, range in size up to 6,500 hectares, and connect with more than 2,400 km of irrigation channels. The largest tanks have clear water in the middle and the edges are often ringed with large trees and abundant vegetation. The smaller tanks tend to become overgrown with weeds. Most tanks are rain-fed and seasonal. Since their waters are used mostly for irrigation, the water levels fluctuate greatly two or three times a year. Over 50 species of dragonflies are found in tank habitats including *Lestes elatus* and *Lestes praemorsus decipiens* of the family Lestidae, *Aciagrion occidentale*, *Ceriagrion coromandelianum*, *Pseudagrion malabaricum* and *P. microcephalum* of the family Coenagrionidae, *Anax guttatus* and *A. indicus* of the family Aeshnidae, *Ictinogomphus rapax* and *Epophthalmia vitatta cynocephala* as the sole representatives of the family Gomphidae and Corduliidae respectively, and *Brachydiplax sobrina*, *Acisoma panorpoides*, *Brachythemis contaminata*, *Crocothemis s. servilia*, *Indothemis carnatica*, *I. limbata sita*, *Rhodothemis rufa* and *Trithemis aurora* of the family Libellulidae. One damselfly species, *Paracercion malayanum*, is found exclusively at tanks with lily pads on which the adults rest.



Richly vegetated smaller tanks, like the one shown above, which is located just below the Sigiriya rock in the lowland north central part of the island, often harbour an interesting dragonfly fauna with over 30 species. Several common and widespread dragonflies are found in these habitats, including *Ceriagrion coromandelianum*, *Pseudagrion malabaricum*, *P. microcephalum*, *Ictinogomphus rapax*, *Brachydiplax sobrina*, *Acisoma panorpoides*, *Brachythemis contaminata*, *Crocothemis s. servilia*, *Rhodothemis rufa*, *Neurothemis t. tullia*, *Trithemis aurora* and *Rhyothemis v. variegata*. Some less common species, such as *Paracercion malayanum*, *Anax indicus* and *Epopthalmia vitatta cynocephala*, can also be observed.

Irrigation channels are rich habitats, particularly those in the wet zone and those with overhanging vegetation. They are home to species such as *Libellago adami*, *Ceriagrion cerinorubellum*, *Pseudagrion rubriceps ceylonicum*, *Prodasineura sita* and *Cyclogomphus gynostylus*.

Rice fields, locally called paddy fields, also provide excellent habitat for dragonflies—with over 833,000 hectares, this huge anthropogenic ecosystem is, at least theoretically, also available for dragonflies. However, the overuse of insecticides in the last few decades has made paddy fields a less desirable habitat. Species still found here include members of the families Coenagrionidae, Lestidae and Libellulidae, such as *Ceriagrion coromandelianum*, *Agriocnemis pygmaea*, *Lestes elatus*, *L. praemorsus*

decipiens, *Neurothemis t. tullia*, *N. i. intermedia*, *Orthetrum s. sabina*, *Rhyothemis v. variegata*, *Pantala flavescens* and *Crocothemis s. servilia*.

Even man-made, shallow water wells provide a home to at least one species, *Bradinopyga geminata*, which can be seen resting and mating inside where it is well-concealed against the stone and concrete walls.

Sri Lanka has an abundance of flowing waters: 103 distinct river basins of which about half originate from the Central Highlands, run over 4560 kilometres in length and cover 90% of the island. These rivers, along with well over forty major waterfalls and their extensive watersheds of associated streams of different magnitudes, including even the smallest trickles, provide excellent habitat for dragonflies.



This slow-moving, well-vegetated irrigation channel off the Talangama tank in the wet zone, just outside Colombo, harbours many species including endemics such as *Libellago adami*, *Prodasineura sita*, *Pseudagrion rubriceps ceylonicum*, *Cyclogomphus gynostylus* and *Macrogomphus lankanensis*.

Most of the species found in these habitats, even some very common ones, are endemic to the island. River and stream species include *Neurobasis c. chinensis* and *Vestalis apicalis nigrescens* of the family Calopterygidae; all four species of *Libellago* of the family Chlorocyphidae; the commonest and strikingly beautiful endemic *Euphaea splendens* of the family Euphaeidae; *Copera marginipes* of the family Platycnemididae; representatives of the family Protoneuridae such as *Elattonneura centralis*, *E. tenax* and *E. oculata*; most of the Gomphidae including *Paragomphus henryi*, *Gomphidia pearsoni* and *Microgomphus wijaya*; as well as *Macromia zeylanica* of the family Corduliidae; and *Trithemis festiva*, *Onychothemis testacea ceylanica* and *Zygonyx iris ceylonicus* of the family Libellulidae. Although most dragonflies love sunny habitats, some species prefer partly shaded,



Small rivulet near Urugalla on the outskirts of the Knuckles represents the habitat of several endemic species including *Drepanosticta austeni*, *D. submontana*, *Elattonneura caesia*, *Macromia zeylanica* and *Zygonyx iris ceylonicus*.

quiet sections of a stream, and some are not deterred by water fast-flowing over stones and boulders. Species that can be found in the vicinity of waterfalls include *Euphaea splendens*, *Libellago finalis*, *Platysticta maculata*, *Heliogomphus walli*, *H. nietneri*, *Trithemis festiva* and *Zygonyx iris ceylonicus*.

Most species of the endemic genera *Drepanosticta* and *Platysticta* are found at small shady streams and trickles at lower elevations and in the lower hills. The commonest of these are *Drepanosticta brincki*, *D. lankanensis* and *Platysticta apicalis*. Three or four species are often found together. They dwell in the undergrowth of wet forests and are quite difficult to spot. Some streams and seeps in the mountain forests are the habitats of rare and enigmatic species such as *Sinhalestes orientalis*, *Drepanosticta montana* and *Elattonneura leucostigma*.



The Gin Ganga river near Deniyaya in the southwestern part of Sri Lanka flows close to the Sinharaja Forest Biosphere Reserve and represents suitable habitat for more than a dozen endemic dragonfly species, including *Libellago greeni*, *Archibasis lieftincki*, *Elattonneura centralis*, *E. oculata*, *Prodasineura sita*, *Burmagomphus pyramidalis sinuatus*, *Heliogomphus walli*, *Macrogomphus lankanensis*, *Gomphidia pearsoni* and *Macromia zeylanica*.

Numerous springs, seeps and wet depressions are particularly common in the wet zone and in wetter localized areas of the dry and intermediate zones. Species found in these habitats include *Elattonneura caesia*, *E. centralis*, *Orthetrum chrysis* and *Cratilla lineata calverti*. Two enigmatic representatives of the family Libellulidae, *Hylaeothemis fruhstorferi* and *Lyriotheemis defonseikai*, are also found in such habitats but so far only in the Sinharaja Forest Biosphere Reserve.

The lowlands also have a wealth of suitable habitats including estuaries, mangrove swamps, lagoons, aquaculture ponds, beaches, and marshes. Several dragonfly species are found in the lowlands including *Macrodiplax cora*, which is restricted to the dry coastal regions, *Brachythemis contaminata* which appears to tolerate brackish conditions, *Trithemis*

pallidinervis which prefers windy, marshy areas, *Diplacodes trivialis* which is often met on sandy beaches, *Mortonagrion ceylonicum* which favours shady, marshy areas, and *Onychargia atrocyana* which favours sunny spots in marshes. *Lathrecista a. asiatica* and most species of *Orthetrum* are common at wet patches in forested areas. At the other end of the scale, pools, marshes and swamps high up in the mountains are inhabited by characteristic species such as *Indolestes g. gracilis*, *Orthetrum t. triangulare* and *Sympetrum fonscolombii*.

Though most species are seen near their natal water source, several species are more commonly seen away from water. An interesting example is *Gynacantha dravida*, which is most often seen at house lights in the evening. *Diplacodes trivialis* is common along footpaths. Others, such as *Aethria-*

manta b. brevipennis and *Urothemis s. signata*, are often seen in open fields. Some species are rarely seen at water or near the ground—they fly or perch high up. These include *Hydrobasileus croceus* and *Tramea basilaris burmeisteri*. *Pantala flavescens* is in a class of its own, with its seasonal mass appearances during which it is commonly seen flying in large groups often far away from water, over fields and roads, even in the cities.

Though Sri Lanka is a small country, there are still many habitats and places that have not been explored for their dragonfly fauna. For instance, phytotelmata—miniature habitats such as water-filled tree holes, pitcher plants, bamboo stumps and pans of buttressed tree roots—are common in the wet zone forests of Sri Lanka. They have not been explored odonatologically though the larvae of some species have been reported to develop in such habitats in other countries (KITCHING, 2000; ORR, 2003). Areas that are still largely unexplored include the many streams and seeps in small rainforest reserves scattered around the southwestern part of the island, large tracts of the Peak Wilderness Sanctuary, and a wide inland belt along the northern and eastern coasts.

All this makes odonatological fieldwork exciting, whether performing faunistic research around a hereto unvisited villu or tank in the lowlands of the north or east of the island, or carefully climbing on the slippery rocks around splashing waterfalls in the central hills, or setting a first odonatological step on the banks of an unexplored rainforest stream in the wet zone. And visits to well researched areas in different seasons are equally important—they often surprise the researcher with interesting findings and observations. This is what makes odonating a challenging and rewarding task.



This small stream near the Hatton-Balangoda pass in the Peak Wilderness Sanctuary is the habitat of the endemic *Sinhalestes orientalis*. The first field observations of this enigmatic species were made only in 2012, more than 150 years after it was first described.

Chapter 4

ODONATOLOGY IN SRI LANKA

Odonatological research in Sri Lanka began over 150 years ago. Early contributions of renowned odonatologists, although somewhat fragmented and partly outdated according to the current scientific standards, are still valuable sources of odonatological information. Moreover, most of these historical collections are preserved in museums in Europe, the United States of America and Sri Lanka and are thus still available for research. In this publication, references to historical accounts are included whenever possible, especially in the handling of individual species in CHAPTER 6, so we present in this chapter only a summary of odonatological activities in Sri Lanka. A detailed overview of early Sri Lankan odonatological history is also offered by DE FONSEKA (2000), and numerous glimpses of various historical subjects are comprehensively detailed by PETHIYAGODA (2007) in the outstanding book *Pearls, Spices and Green Gold – An Illustrated History of Biodiversity Exploration in Sri Lanka*.

H. A. HAGEN made the first contributions to the knowledge of the island's dragonflies in the middle of the 19th century as the Order Neuroptera. His species descriptions were included in publications by the “father” of odonatology, M. E. de SELYS - LONGCHAMPS. Hagen deserves special recognition as the author of the descriptions of 15 endemic species that are still valid today. It has to be stressed that all this would not have been possible without J. NIETNER, a gardener and coffee plantation owner in Sri Lanka, who was also an enthusiastic entomologist, botanist and collector. He sent his specimens to museums in Europe where they were studied by the eminent scientists of the day.

A list of over 30 dragonfly species based on Hagen's early contributions was included in the famous monograph, *Ceylon: An Account of the Island Physical, Historical and Topographical with Notices of its Natural History, Antiquities and Productions* by J. E. TENNENT in 1859. W.F. KIRBY, a well-known entomologist, continued the tradition of odonatological work. He compiled the first annotated list of 76 species known to the island in 1894. Three decades later, in 1924, it was another famous odonatologist, F. F. LAIDLAW, who published an annotated list of 88 dragonfly species from Sri Lanka. The accounts of Kirby and Laidlaw, like those of Hagen, were mainly based on collections presented to them by others, such as Col. J. W. YERBURY of the Royal Artillery who was stationed at Trincomalee, and E. E. GREEN, the then Government Entomologist in Sri Lanka.

Another important landmark in the first half of 20th century was the publication of *The Fauna of British India including Ceylon and Burma: Odonata* in three volumes (1933–1936) by F. C. FRASER, the doyen of odonatology in the first half of the 20th century. These volumes and his numerous articles are still relevant for odonatological research in Sri Lanka today. Although Fraser received material from collectors, he also completed field trips in Sri Lanka by himself, the highlights of which are vividly described in his excellent articles on the endemic representatives of the families Platystictidae and Gomphidae. At this point, Sri Lanka was among the most well-researched tropical countries in Southeast Asia.

One of the greatest odonatologists of all time, M.A. LIEFTINCK, also added to the research of the

island's dragonfly fauna both by reviewing specimens submitted by others as well as by doing his own field research. In 1940, after a week-long collecting visit to Sri Lanka, he described a few new species and the larval stages of several endemics. With several well-researched papers, he has left an indelible impression on Sri Lankan odonatology.

Research continued in the second half of the 20th century, with some collaborative projects between foreign and local Sri Lankan institutions. In 1951, Laidlaw published the first zoogeographical analysis of the odonate fauna of Sri Lanka—he listed 100 dragonfly species known to occur on the island, compared the composition of the dragonfly fauna with adjacent regions, described important differences with south India and singled out the zoogeographical peculiarities of Sri Lanka. In the next two decades, Lieftinck also described many new endemic species: first in 1955, based on a rich collection brought from the island by the Swiss dipterologist F. KEISER, and then in 1971, based on a collection sent to him by the Swedish researchers of the Lund University. Fieldwork done by the Austrian-Ceylonese Hydrobiological Mission 1970 resulted in an interesting paper on the larval ecology of some species (ST. QUENTIN, 1973). Another foreign cooperation project, *The Smithsonian Insect Project in Sri Lanka* between the Smithsonian Institution (USA) and the Colombo National Museum, resulted in the most comprehensive field survey to date and included dragonflies. Lasting from 1969–1975, a large proportion of the fieldwork was carried out by entomologist O. S. FLINT who sent material to M. A. Lieftinck in Europe for identification. Unfortunately, due to his considerable age and preoccupation with other projects, Lieftinck was forced to terminate the preparation of the manuscript despite having identified most of the species in the collection. Luckily, all the material is still available. In faunistic and taxonomic studies it is never too late to learn from and catch up with the past. With thanks to the kind support of Dr. Flint, all faunistic data from the collection have been included in the present work.

Before the break of the millennium, after years of inactivity, interest in the dragonflies of Sri Lanka rose again. Thanks to the work of two Sri Lankans, T. DE FONSEKA and naturalist and publisher R.

PETHIYAGODA, the first book on the dragonfly fauna of Sri Lanka, titled *The Dragonflies of Sri Lanka*, was published by the Wildlife Heritage Trust in 2000. It included an overview of many different aspects including the history of odonatological research, a compilation of the known species descriptions, identification keys for adults and larvae, summaries of distribution records, and notes on ecology. Despite some deficiencies and gaps it represented an important milestone in Sri Lankan odonatological research. A few years earlier, M. BEDJANIČ had started his odonatological studies, mainly in the fields of faunistics, taxonomy and conservation. He was soon followed by K. CONNIFF, N. VAN DER POORTEN and others.

Simultaneously with advances in taxonomy and with growing knowledge on the distribution of species, it became clear that many endemics are highly threatened. The first list of threatened species was enumerated in the publication, *The 1999 List of Threatened Flora and Fauna of Sri Lanka* by IUCN Sri Lanka. Some years later, in 2006 and 2009 M. Bedjanič, as a member of the Odonata Specialist Group of the IUCN Species Survival Commission, assessed more than 20 endemic dragonfly species, which were subsequently listed on the IUCN Global Red List of Threatened Species. Recently, N. van der Poorten and K. Conniff contributed an important overview of the threat status of the island's dragonfly fauna for *The National Red List 2012 of Sri Lanka* published by the Ministry of Environment.

A chronological selection of the most important works in the fields of faunistics, taxonomy and conservation, with an emphasis on endemic taxa. It presents a comprehensive overview of the long history of odonatological research in Sri Lanka. Full citations of the relevant papers, together with over 200 additional references containing faunistic or other information on the dragonflies of the island, are included in the Odonatological bibliography in CHAPTER 10.

- SELYS (1853): *Euphaea splendens* described by H. A. Hagen.
- HAGEN (1858): Based on material collected by J. Nietner, the first list of 28 species from Sri Lanka was compiled with morphometrical and locality data.
- HAGEN (1859): Based on the rich collection of dragonflies sent by J. Nietner, a list of an additional 10 species was given with locality data, as an amendment of HAGEN (1858). Seven species were new for the island.
- TENNENT (1859): A list of 31 species from the island, based on the publications of H. A. Hagen.
- SELYS (1860b): Descriptions of *Drepanosticta digna*, *D. hilaris*, *D. montana*, *D. tropica*, *Platysticta maculata*, *Elattonneura caesia*, *E. centralis* and *E. tenax* provided by H. A. Hagen.
- SELYS (1862): Descriptions of *Sinhalestes orientalis*, *Indolestes divisus* and *I. gracilis* by H. A. Hagen.
- HAGEN (1867): Description of *Epophthalmia vittata cyanocephala*.
- SELYS (1869): Description of *Libellago finalis* by H. A. Hagen.
- SELYS (1878): Descriptions of *Heliogomphus ceylonicus* (now *Anisogomphus ceylonicus*) and *H. nietneri* by H. A. Hagen.
- KARSCH (1889): Description of *Hylaeothemis fruhstorferi*.
- KIRBY (1891): A list of 14 dragonfly species collected by E. E. Green. Descriptions of *Pseudagrion rubriceps ceylonicum* and *Platysticta greeni* (now a synonym of *P. maculata*).
- KIRBY (1894): An annotated list of 76 dragonfly species from Sri Lanka, based on material collected by J. W. Yerbury, with numerous faunistic and taxonomical notes. Descriptions of 10 new species, among them *Platysticta apicalis*, *Elattonneura oculata*, *Prodasineura sita* and *Tetrathemis yerburii*.
- KIRBY (1905): A list of 20 dragonfly species collected by E. E. Green. Description of *Zygonyx iris ceylonicus*.
- LAIDLAW (1922): Description of *Megalogomphus ceylonicus*.
- LAIDLAW (1924): An annotated list of 88 dragonfly species from Sri Lanka, based on literature data and material collected by E. E. Green, with an analysis of the fauna and numerous taxonomic and faunistic notes. Description of *Libellago greeni*.
- FRASER (1925): Description of *Heliogomphus walli*.
- FRASER (1926b): Description of *Cyclogomphus gynostylus*.
- FRASER (1927): Description of *Macromia zeylanica*.
- CAMPION & LAIDLAW (1928): Description of *Paragomphus henryi* by F. F. Laidlaw.
- FRASER (1929b): Description of *Vestalis apicalis nigrescens*.
- FRASER (1931b): Partial revision of the representatives of the subfamily Platystictinae from Sri Lanka and India, with an identification key, descriptions and locality data. Descriptions of *Drepanosticta nietneri*, *D. lankanensis* and *D. walli*.
- FRASER (1933a): First volume of the comprehensive monograph on the dragonflies in the superfamilies Lestoidea and Coenagrionoidea of the Indian subcontinent, including Myanmar and Sri Lanka, with detailed species descriptions, identification keys, and figures as well as faunistic and taxonomic notes.
- FRASER (1933b): Revision of the representatives of the family Platystictidae from Sri Lanka, with an identification key, descriptions of species, biology and locality data. Descriptions of *Drepanosticta adami*, *D. subtropica* and *D. submontana*.
- FRASER (1933c): Description of *Elattonneura leucostigma*.
- FRASER (1933d): Revision of the representatives of the family Gomphidae from Sri Lanka, with species descriptions as well as biology and locality data. Descriptions of *Gomphidia pearsoni*, *Macrogomphus lankanensis*, *Heliogomphus lyratus* and *Burmagomphus pyramidalis sinuatus*.
- FRASER (1934): Second volume of the comprehensive monograph on the dragonflies in the superfamilies Calopterygoidea and Gomphioidea and suborder Anisozygoptera of the Indian subcontinent, including Myanmar and Sri Lanka, with detailed species descriptions, identification keys, and figures as well as faunistic and taxonomic notes.
- FRASER (1936): Third volume of the comprehensive monograph on the dragonflies in the superfamilies Cordulegastroidea, Aeshnoidea and Libelluloidea of the Indian subcontinent, including Myanmar and Sri Lanka, with detailed species descriptions, identification keys, and figures as well as faunistic and taxonomic notes.

- FRASER (1939): Description of *Libellago adami*, with notes on the type locality and biology.
- LIEFTINCK (1940): Treatment of a collection of 30 species, gathered by the author during a one week fieldtrip to Sri Lanka. Descriptions of *Drepanosticta austeni* and *Microgomphus wijaya* and descriptions of the last larval stage of *Macromia zeylanica*, *Microgomphus wijaya*, *Burmagomphus pyramidalis sinuatus* and *Paragomphus henryi*.
- LAIDLAW (1951): Zoogeographical analysis of the odonate fauna of Sri Lanka and comparison with adjacent regions. An annotated list of the 100 dragonfly species known to occur on the island.
- LIEFTINCK (1955): An annotated list of 107 dragonfly species from Sri Lanka, based on the collection of Swiss dipterologist F. Keiser, with numerous faunistic and taxonomic notes. Descriptions of *Drepanosticta fraseri* (now a synonym of *D. submontana*) and *Macrogomphus annulatus keiseri*.
- LIEFTINCK (1971a): An annotated list of 112 species known from Sri Lanka including 64 species from the collection of the Swedish researchers of the Lund University Ceylon Expedition, with numerous faunistic and taxonomic notes. Descriptions of *Drepanosticta brincki*, *D. sinhalensis* (now a synonym of *D. lankanensis*), *Disparoneura ramajana* (now a synonym of *E. leucostigma*), *Elattonneura bigemmata* (now a synonym of *E. oculata*), *Mortonagrion ceylonicum* and *Anisogomphus solitaris* (now a synonym of *A. ceylonicus*), for which a description of exuvia was also provided.
- ST. QUENTIN (1973): A contribution to the knowledge of larval ecology of 10 species from Sri Lanka, based on material collected by the Austrian researchers of the Austrian-Ceylonese Hydrobiological Mission of the Zoological Institute of the University of Vienna (Austria) and the Department of Zoology of the Vidyalkara University of Ceylon, Kelaniya. Description of the last larval stage of *Zygonyx iris ceylonicus*.
- LIEFTINCK (1977): Description of *Macromia flinti* with a note on *M. zeylanica*, based on material collected by US entomologist O. S. Flint during the Smithsonian Insect Project in Sri Lanka.
- DE FONSEKA (2000): The first book devoted solely to the dragonfly fauna of Sri Lanka; mainly a compilation of all published knowledge to date from numerous scattered sources. *The Dragonflies of Sri Lanka* included a list of 117 species and subspecies from the island, identification keys for adults and for some larval stages, with a compilation of figures from various published sources, an overview of the available faunistic data, and a compilation of notes on biology and distribution etc.
- IUCN SRI LANKA (2000): The first provisional list of threatened dragonfly species, published in *The 1999 List of Threatened Flora and Fauna of Sri Lanka*.
- BEDJANIĆ (2000): Description of exuvia of *Epopthalmia vittata cyanocephala*.
- BEDJANIĆ (2004): A comprehensive analysis and overview of the research state and threat status of the dragonfly fauna of Sri Lanka, with conservation and research recommendations published in the monograph, *Guardians of the watershed - Global status of dragonflies: critical species, threat and conservation*. Preliminary assessment of the threat status of several endemic species.
- BEDJANIĆ (2006b): A review of the taxonomy, research and conservation of the dragonfly fauna of Sri Lanka in the monograph, *Fauna of Sri Lanka: Status of Taxonomy, Research and Conservation*, published by the IUCN Sri Lanka and the Government of Sri Lanka.
- BEDJANIĆ et al. (2007): First photographic field guide to the dragonflies of Sri Lanka, with colour photographs, common names in English, Sinhala and Tamil languages and descriptions of 91 species including 35 endemics.
- CONNIFF & VAN DER POORTEN (2008): Description of the female of *Elattonneura caesia* with notes on behaviour, habitat, distribution and field identification characters including *E. centralis*.
- VAN DER POORTEN (2009a): Description of *Lyriothemis defonsekai*.
- VAN DER POORTEN (2009c): Description of *Libellago corbeti*.
- BEDJANIĆ (2010): Descriptions of *Drepanosticta anamia*, *D. bine* and *D. mojca*.
- CONNIFF et al. (2011): Description of the female of *Mortonagrion ceylonicum*, with notes on its habitat, distribution and behaviour.
- VAN DER POORTEN (2012): Description of *Macromidia donaldi pethiyagodai*.
- VAN DER POORTEN & CONNIFF (2012): An overview of the conservation and research status of the dragonfly fauna of the island in the latest nature conservation publication, *The National Red List 2012 of Sri Lanka: Conservation Status of the Fauna and Flora*. A list of 118 dragonfly species and their Red List status was given. Published by the Ministry of Environment of Sri Lanka.
- BEDJANIĆ (2013a): Description of *Paragomphus campestris*.
- CONNIFF & BEDJANIĆ (2013): Descriptions of *Archibasis lieftincki* and *A. oscillans hanwellanensis*.

Odonatology in Sri Lanka in the last decade has seen important advances in faunistics, taxonomy and conservation. It has also seen a growing awareness among the lay public, students and tourists who are interested in the beautiful nature of the island. It was wildlife writer, photographer and ecotourism expert G. DE SILVA WIJEYERATNE who passionately recognized the potential of the flora and fauna of the island for tourism. With the support of the Sri Lankan ecotourism company JETWING ECO HOLIDAYS, he drew attention to wildlife topics with beautiful, easy to use books and by giving lectures and aiding research and conservation work. As regards dragonflies, numerous photographic leaflets, booklets and posters were published in Sinhala and English in collaboration with K. Conniff and M. Bedjanič and sponsored by JETWING ECO HOLIDAYS, and were made

freely available to all interested. The field book, *Gehan's Photo Guide: A Photographic Guide to the Dragonflies of Sri Lanka* is also a result of this fruitful initiative.

In the last few years, several young Sri Lankan naturalists have also contributed new information—S. GUNASINGHE, A. P. SUMANAPALA, H. LANKIKA MADUMAGE and N. ABAYALATH among others have started their studies on the dragonfly fauna of Sri Lanka and it is hoped that more will follow. It is one of the main objectives of the present book to raise interest in this beautiful and interesting insect group among researchers and naturalists in Sri Lanka and to stimulate local and international collaboration. Only in this way, will odonatology in Sri Lanka have a bright and prolific future.

Chapter 5

LIST OF THE DRAGONFLY SPECIES OF SRI LANKA

According to our present knowledge altogether 124 dragonfly species from 12 families occur in Sri Lanka. Endemicity is remarkably high—exactly 49.2% of the odonate fauna, comprising 52 species and 9 subspecies, are endemic and are marked with an asterisk in the faunal list below.

As with any faunal overview of a certain region or country, the present list has evolved through many decades with new entries on one side and deletions of erroneous listings on the other. Among the latter, historical citations of *Aciagrion hisopa* (Selys, 1876), *Neurothemis fluctuans* (Fabricius, 1793), *Neurothemis terminata* Ris, 1911, *Trithemis kirbyi kirbyi* Selys, 1891, *Rhyothemis obsolescens* Kirby, 1889 and *Rhyothemis phyllis phyllis* (Sulzer, 1776) can be counted. Since for these records no material proof has ever been found, and since they are probably due to incorrect determinations they have been noted and removed from the company of Sri Lankan dragonflies decades ago by different authors.

Based on recent field research and taxonomic work additional taxa or names have been removed from the species list:

- *Libellago indica* (Fraser, 1928): species does not occur in Sri Lanka—see HÄMÄLÄINEN et al. (2012) and VAN DER POORTEN (2012b)
- *Disparoneura ramajana* Lieftinck, 1971: junior synonym of *Elattonneura leucostigma* (Fraser, 1933)—see BEDJANIČ (2012b)
- *Elattonneura bigemmata* Lieftinck, 1971: junior synonym of *Elattonneura oculata* (Kirby, 1894)—see BEDJANIČ (2008)
- *Drepanosticta fraseri* Lieftinck, 1955: junior synonym of *D. submontana* (Fraser, 1933)—see BEDJANIČ (2009a)
- *Drepanosticta starmuehlneri* St. Quentin, 1972 and *Drepanosticta sinhalensis* Lieftinck, 1971: junior synonyms of *Drepanosticta lankanensis* (Fraser, 1931)—see BEDJANIČ (2009a, 2012b)
- *Anisogomphus solitaris* Lieftinck, 1971: junior synonym of *Anisogomphus ceylonicus* (Hagen, 1878)—see BEDJANIČ & VAN DER POORTEN (2013)
- *Palpopleura sexmaculata sexmaculata* (Fabricius, 1787): species does not occur in Sri Lanka—see VAN DER POORTEN (2011b).

Altogether nine new taxa have been described from Sri Lanka in the last four years: *Libellago corbeti* van der Poorten, 2009, *Archibasis lieftincki* Conniff & Bedjanič, 2013, *Archibasis oscillans hanwellanensis* Conniff & Bedjanič, 2013, *Drepanosticta anamia* Bedjanič, 2010, *Drepanosticta bine* Bedjanič, 2010, *Drepanosticta mojca* Bedjanič, 2010, *Paragomphus campestris* Bedjanič, 2013, *Macromidia donaldi pethiyagodai* van der Poorten, 2012 and *Lyriothemis defonseikai* van der Poorten, 2009. Four additional novelties that are confined to the island are included in the list of species. Their descriptions will follow in the near future, with manuscripts in preparation (BEDJANIČ & CONNIF, in prep; BEDJANIČ & VAN TOL, in prep).

It goes without saying that the list of dragonflies of Sri Lanka will probably be updated in the future since discoveries of new species are expected, however probably not in the quantity of the last couple of years.

Nomenclature mainly follows BRIDGES (1994) and recent taxonomic literature. The internet database *Odonata Taxonomy* of Naturalis Biodiversity Center in Leiden (www.odonata.info) has also been consulted in some doubtful cases.

Order ODONATA

Suborder ZYGOPTERA

Family Calopterygidae

Neurobasis Selys, 1853

- 1.) *N. chinensis chinensis* (Linnaeus, 1758)

Vestalis Selys, 1853

- * 2.) *V. apicalis nigrescens* Fraser, 1929

Family Chlorocyphidae

Libellago Selys, 1840

- * 3.) *L. adami* Fraser, 1939
* 4.) *L. corbeti* van der Poorten, 2009
* 5.) *L. finalis* (Hagen, 1869)
* 6.) *L. greeni* (Laidlaw, 1924)

Family Euphaeidae

Euphaea Selys, 1840

- * 7.) *E. splendens* Hagen, 1853

Family Lestidae

Lestes Leach, 1815

- 8.) *L. elatus* Hagen, 1862
9.) *L. malabaricus* Fraser, 1929
10.) *L. praemorsus decipiens* Kirby, 1894

Sinhalestes Fraser, 1951

- * 11.) *S. orientalis* (Hagen, 1862)

Indolestes Fraser, 1922

- * 12.) *I. divisus* (Hagen, 1862)
* 13.) *I. gracilis gracilis* (Hagen, 1862)

Family Coenagrionidae

Onychargia Selys, 1865

- 14.) *O. atrocyana* Selys, 1865

Agriocnemis Selys, 1877

- 15.) *A. femina* (Brauer, 1868)
16.) *A. pygmaea* (Rambur, 1842)

Mortonagrion Fraser, 1922

- * 17.) *M. ceylonicum* Lieftinck, 1971

Paracercion Weekers & Dumont, 2004

- 18.) *P. malayanum* (Selys, 1876)

Aciagrion Selys, 1892

- 19.) *A. occidentale* Laidlaw, 1919

Ischnura Charpentier, 1840

- 20.) *I. aurora rubilio* Selys, 1876
21.) *I. senegalensis* (Rambur, 1842)

Amphiallagma Kennedy, 1920

- 22.) *A. parvum* (Selys, 1876)

Ceriagrion Selys, 1876

- 23.) *C. cerinorubellum* (Brauer, 1865)
24.) *C. coromandelianum* (Fabricius, 1798)

Pseudagrion Selys, 1876

- 25.) *P. decorum* (Rambur, 1842)
26.) *P. malabaricum* Fraser, 1924
27.) *P. microcephalum* (Rambur, 1842)
* 28.) *P. rubriceps ceylonicum* (Kirby, 1891)

Archibasis Kirby, 1890

- * 29.) *A. lieftincki* Conniff & Bedjanič, 2013
* 30.) *A. oscillans hanwellanensis* Conniff & Bedjanič, 2013

Family Platycnemididae

Copera Kirby, 1890

- 31.) *C. marginipes* (Rambur, 1842)

Family Platystictidae

Drepanosticta Laidlaw, 1917

- * 32.) *D. anamia* Bedjanič, 2010
* 33.) *D. adami* (Fraser, 1933)
* 34.) *D. austeni* Lieftinck, 1940
* 35.) *D. bine* Bedjanič, 2010
* 36.) *D. brincki* Lieftinck, 1971
* 37.) *D. digna* (Hagen, 1860)
* 38.) *D. hilaris* (Hagen, 1860)
* 39.) *D. lankanensis* (Fraser, 1931)
* 40.) *D. mojca* Bedjanič, 2010
* 41.) *D. montana* (Hagen, 1860)
* 42.) *D. nietneri* (Fraser, 1931)
* 43.) *D. submontana* (Fraser, 1933)
* 44.) *D. subtropica* (Fraser, 1933)
* 45.) *D. tropica* (Hagen, 1860)
* 46.) *D. walli* (Fraser, 1931)
* 47.) *D. sp. nov. A* [Bedjanič & Conniff, in prep.]
* 48.) *D. sp. nov. B* [Bedjanič & Conniff, in prep.]

Platysticta Selys, 1860

- * 49.) *P. apicalis* Kirby, 1894
- * 50.) *P. maculata* Selys, 1860
- * 51.) *P. sp. nov. A* [Bedjanič & van Tol, in prep.]
- * 52.) *P. sp. nov. B* [Bedjanič & van Tol, in prep.]

Family Protoneuridae**Elatoneura Cowley, 1935**

- * 53.) *E. caesia* (Hagen, 1860)
- * 54.) *E. centralis* (Hagen, 1860)
- * 55.) *E. leucostigma* (Fraser, 1933)
- * 56.) *E. oculata* Kirby, 1894
- * 57.) *E. tenax* (Hagen, 1860)

Prodasineura Cowley, 1935

- * 58.) *P. sita* (Kirby, 1894)

Suborder Anisoptera**Family Aeshnidae****Anaciaeschna Selys, 1878**

- 59.) *A. donaldi* Fraser, 1922

Anax Leach, 1815

- 60.) *A. ephippiger* (Burmeister, 1839)
- 61.) *A. guttatus* (Burmeister, 1839)
- 62.) *A. immaculifrons* Rambur, 1842
- 63.) *A. indicus* Lieftinck, 1942
- 64.) *A. tristis* Hagen, 1867

Gynacantha Rambur, 1842

- 65.) *G. dravida* Lieftinck, 1960

Family Gomphidae**Anisogomphus Selys, 1857**

- * 66.) *A. ceylonicus* (Hagen, 1878)

Burmagomphus Williamson, 1907

- * 67.) *B. pyramidalis sinuatus* Fraser, 1933

Cyclogomphus Selys, 1854

- * 68.) *C. gynostylus* Fraser, 1926

Heliogomphus Laidlaw, 1922

- * 69.) *H. lyratus* Fraser, 1933
- * 70.) *H. nietneri* (Hagen, 1878)
- * 71.) *H. walli* Fraser, 1925

Macrogomphus Selys, 1857

- * 72.) *M. annulatus keiseri* Lieftinck, 1955
- * 73.) *M. lankanensis* Fraser, 1933

Microgomphus Selys, 1857

- * 74.) *M. wijaya* Lieftinck, 1940

Megalogomphus Campion, 1923

- * 75.) *M. ceylonicus* (Laidlaw, 1922)

Paragomphus Cowley, 1934

- * 76.) *P. henryi* (Laidlaw, 1928)
- * 77.) *P. campestris* Bedjanič, 2013

Gomphidia Selys, 1854

- * 78.) *G. pearsoni* Fraser, 1933

Ictinogomphus Cowley, 1934

- 79.) *I. rapax* (Rambur, 1842)

Family Corduliidae**Epophthalmia Burmeister, 1839**

- * 80.) *E. vittata cyanocephala* Hagen, 1867

Macromia Rambur, 1842

- * 81.) *M. flinti* Lieftinck, 1977
- * 82.) *M. zeylanica* Fraser, 1927

Macromidia Martin, 1907

- * 83.) *M. donaldi pethiyagodai* van der Poorten, 2012

Family Libellulidae**Hylaeothemis Ris, 1909**

- * 84.) *H. fruhstorferi* (Karsch, 1889)

Tetrathemis Brauer, 1868

- * 85.) *T. yerburii* Kirby, 1894

Brachydiplax Brauer, 1868

- 86.) *B. sobrina* (Rambur, 1842)

Cratilla Kirby, 1900

- 87.) *C. lineata calverti* Förster, 1903

Lathrecista Kirby, 1889

- 88.) *L. asiatica asiatica* (Fabricius, 1798)

Lyriotheemis Brauer, 1868

- * 89.) *L. defonsekai* van der Poorten, 2009

Orthetrum Newman, 1833

- 90.) *O. chrysis* (Selys, 1891)
- 91.) *O. glaucum* (Brauer, 1865)
- 92.) *O. luzonicum* (Brauer, 1868)
- 93.) *O. pruinatum neglectum* (Rambur, 1842)
- 94.) *O. sabina sabina* (Drury, 1773)
- 95.) *O. triangulare triangulare* (Selys, 1878)

Potamarcha Karsch, 1890

- 96.) *P. congener* (Rambur, 1842)

- Acisoma Rambur, 1842**
97.) *A. panorpoides* Rambur, 1842
- Brachythemis Brauer, 1868**
98.) *B. contaminata* (Fabricius, 1793)
- Bradinopyga Kirby, 1894**
99.) *B. geminata* (Rambur, 1842)
- Crocothemis Brauer, 1868**
100.) *C. servilia servilia* (Drury, 1770)
- Diplacodes Kirby, 1889**
101.) *D. nebulosa* (Fabricius, 1793)
102.) *D. trivialis* (Rambur, 1842)
- Indothemis Ris, 1909**
103.) *I. carnatica* (Fabricius, 1798)
104.) *I. limbata sita* Campion, 1923
- Neurothemis Brauer, 1867**
105.) *N. intermedia intermedia* (Rambur, 1842)
106.) *N. tullia tullia* (Drury, 1773)
- Rhodothemis Ris, 1909**
107.) *R. rufa* (Rambur, 1842)
- Sympetrum Newman, 1833**
108.) *S. fonscolombii* (Selys, 1840)
- Trithemis Brauer, 1868**
109.) *T. aurora* (Burmeister, 1839)
110.) *T. festiva* (Rambur, 1842)
111.) *T. pallidinervis* (Kirby, 1889)
- Onychothemis Brauer, 1868**
112.) *O. testacea ceylanica* Ris, 1912
- Rhyothemis Hagen, 1867**
113.) *R. triangularis* Kirby, 1889
114.) *R. variegata variegata* (Linnaeus, 1763)
- Hydrobasileus Kirby, 1889**
115.) *H. croceus* (Brauer, 1867)
- Pantala Hagen, 1861**
116.) *P. flavesceus* (Fabricius, 1798)
- Tramea Hagen, 1861**
117.) *T. basilaris burmeisteri* Kirby, 1889
118.) *T. limbata* (Desjardins, 1832)
- Tholymis Hagen, 1867**
119.) *T. tillarga* (Fabricius, 1798)
- Zyxomma Rambur, 1842**
120.) *Z. petiolatum* Rambur, 1842
- Aethriamanta Kirby, 1889**
121.) *A. brevipennis brevipennis* (Rambur, 1842)
- Macrodiplax Brauer, 1868**
122.) *M. cora* (Kaup, 1867)
- Urothemis Brauer, 1868**
123.) *U. signata signata* (Rambur, 1842)
- Zygonyx Selys, 1867**
* 124.) *Z. iris ceylonicus* (Kirby, 1905)

Just before finishing the present book, two important articles on the classification and phylogeny of Odonata were published. The first reviews the classification and diversity of dragonflies and damselflies (DIJKSTRA et al., 2013a) and the second redefines the damselfly families based on the most comprehensive molecular reconstruction of their phylogeny to date (DIJKSTRA et al., 2013b).

This has a direct impact on the classification of some Sri Lankan species. To avoid further delay of this publication, the traditional family affiliations and generic names in the species list, species accounts and elsewhere have been retained. The most important novelties are briefly summarized below. However, for more detailed argumentation and explanation, reference to the original open access articles is recommended.

Both studies disband the family Protoneuridae completely, as the American representatives belong to Coenagrionidae and those from Africa, Asia and Australia to Platycnemididae. Thus, the Old World Protoneuridae, including all Sri Lankan species currently placed in the genera *Elattonneura* and *Prodasineura*, are placed in the subfamily Disparoneurinae of Platycnemididae. Also, DIJKSTRA et al. (2013b) indicate that the Asian species now placed in *Elattonneura* are not related closely to that African

genus. Their taxonomy at generic level is unclear at present and requires revision. Furthermore, the genus *Onychargia* is transferred from Coenagrionidae to the new subfamily Onychargiinae of the Platycnemididae.

The Sri Lankan group of species in Platystictidae is distantly related to the remaining family and therefore a new subfamily Protostictinae has been erected to limit the subfamily Platystictinae to Sri Lanka. Consequently, Fraser's genus *Ceylonosticta* has been reinstated for all Sri Lankan species formerly placed in *Drepanosticta*. However, *Ceylonosticta* appears paraphyletic relative to *Platysticta* and the generic placement of all Sri Lankan species must be revised and further name-changes are anticipated (DIJKSTRA et al. 2013b).

In accordance with earlier work, DIJKSTRA et al. (2013a) treat Macromiidae as a family related to but distinct from traditional Corduliidae. *Macromia* and *Epophthalmia* thus belong to Macromiidae, while *Macromidia* cannot be assigned to any family at present and belongs to the group of systematically problematic genera of the superfamily Libelluloidea, treated as *incertae sedis* (i.e. unplaced) until further study.

Chapter 6

DISTRIBUTION AND BIOLOGY OF THE DRAGONFLIES OF SRI LANKA: METHODOLOGY, SUMMARY OF RESULTS AND SPECIES' ACCOUNTS

When one's interest in dragonflies outgrows the initial stage of overall admiration and basic species recognition, a broad array of questions soon arises. This book aims to provide answers to many of these questions—especially those related to the distribution, biology and behaviour of individual species, as well as those related to their threat status and their long-term conservation.

While many dragonfly books with similar objectives and scope have been published in Europe, America and Japan in the last two decades, knowledge on the dragonfly fauna of many countries and regions across the rest of the world has never been systematically summarized and remains poor. In this respect, especially as regards the wide coverage of a variety of odonatological topics and mode of presenting results, this book is the first of its kind in South and Southeast Asia and even among the first in the tropics globally.

As outlined in CHAPTER 4, the history of odonatological research in Sri Lanka spans 160 years. An important part of research for this book actually started in the past—in order to move forward, all available data and knowledge on the distribution, taxonomy and biology of the dragonflies of Sri Lanka had to be summarized. Thus the project, *Distribution Atlas of the Dragonflies of Sri Lanka*, was founded in 2005 and the complementary database was established. The objectives of the project were to collate all available faunistic information for each dragonfly species from publications, museum collections and field research and then to add new information on the distributions

of the individual species. In subsequent years, with the growing amount of new data, better spatial and temporal coverage and increased knowledge, the objectives of the project broadened, providing not only distributional overviews but also insights into seasonal phenologies, altitudinal distributions and threat status of the species.

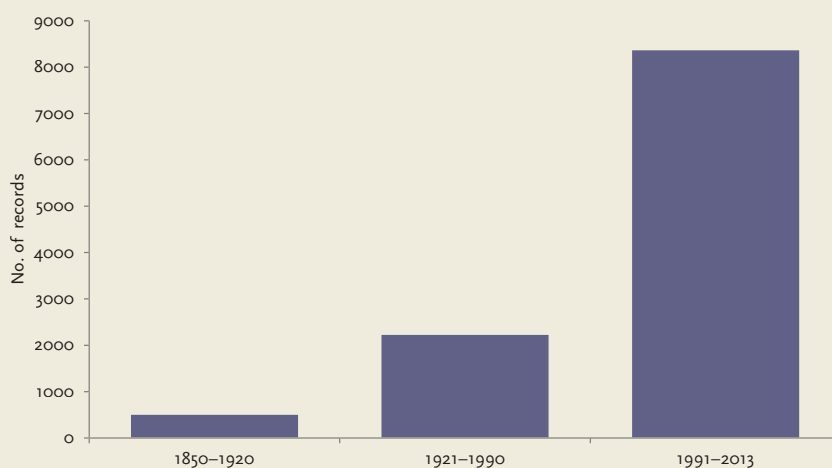
In September 2013, the odonatological database was closed for new entries in order to prepare the present publication. It consisted of 11,094 faunistic records, derived from the middle of the 19th century and spanning to the recent field observations in 2013. All available information on the dragonflies of Sri Lanka known to the authors, extracted from various literature sources, museum collections in Europe, USA and Sri Lanka or—and especially so—submitted as unpublished field observations of the authors and numerous colleagues, were databased. An analysis of the number of dragonfly records collected in different periods from 1850 to 2013 shows a sharp increase in odonatological research intensity in the last two decades from which 75% of all records originate.

In the database language, a record denotes the documented presence of a species on a specific date at a specific location. A location—also called a locality—was used as the basic unit of the mapping and presentation of the distribution of a species, denoting an exact geo-referenced and unique geographical place. Due to differences in the quality of geographical data, especially that in older published data, the locations in the database are of different spatial

accuracy. For example, many of the older records state only the name of a city or village while newer records usually designate a GPS reading. In the cases where only a city or village name has been given, e.g. “Trincomalee” or “Kandy”, the location in the database uses the coordinates of that place, although in reality the exact location of the observation may have been in the surrounding area. In a few cases, the records were marked as ambiguous and were not used. For example, many villages in Sri Lanka have the same name and without additional information, it was not possible to determine the exact location. In other cases, there was only a general mention of the species’ occurrence in Sri Lanka without stating a locality. However, the majority of newer data were carefully geolocated in the field and are spatially accurate. In general, a database location was created for any observation of a species in a place that is at least 1 kilometre apart from the nearest existing location. This distance might have been less in the cases of clearly different habitats, e.g. a stream in the forest and a paddy field a hundred metres away were usually regarded as two localities. In the case of

very rare or poorly known species, separate localities were formed for close or connecting locations such as forest streams or a stream and adjacent marshes, all with the aim of retaining as much detail as possible. On a larger scale and for the purpose of getting an overview of distributions, such splitting may not make sense at a first sight. However, for subsequent analyses of the habitat requirements and preferences of individual species or for detailed evaluations for conservation, the extra data is extremely valuable. In order not to lose biologically important information, the deficiencies in the quality of data have to be accepted, but should be taken into account in some instances when data is interpreted.

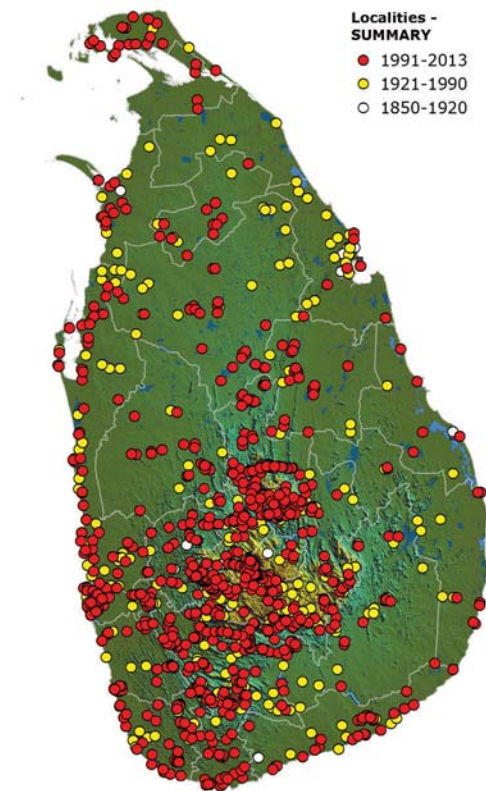
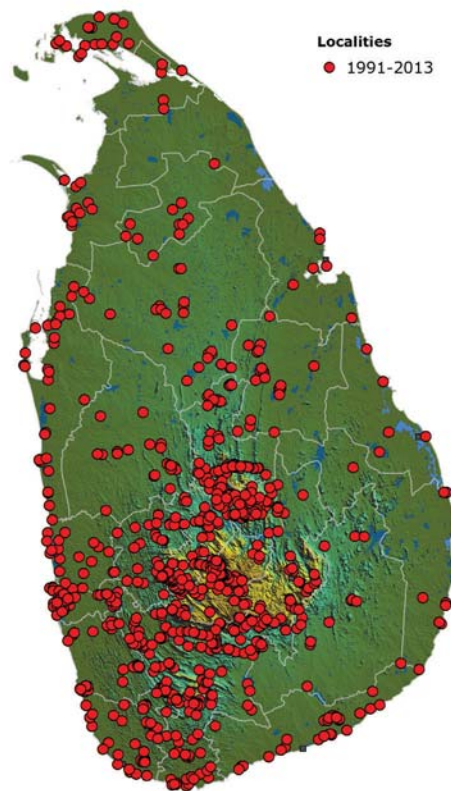
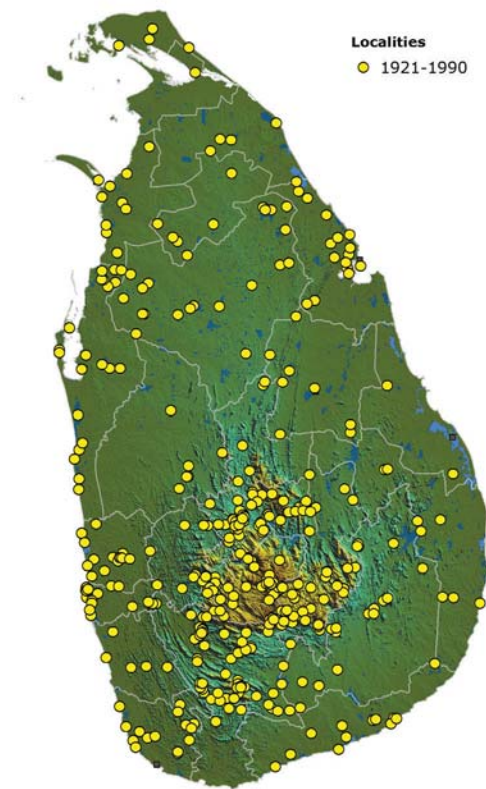
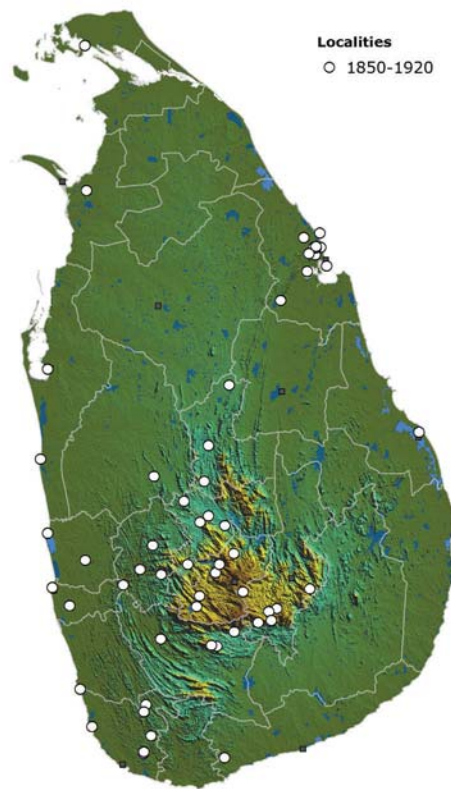
In summary, the database currently contains 1,237 localities with odonatological records from all over Sri Lanka. The localities have been geolocated on the basis of different topographic layers with the help of GIS software, Google Earth and various internet geolocators and, in the case of recent data, mainly with a GPS device used in the field. With the help of MS Excel, MS Access and ArcGIS, different analyses and distribution maps were produced.



Number of dragonfly records collected in different periods: 1850–1920; 1921–1990 and 1991–2013.

Two principles were used in the collection and evaluation of data: (i) any record is better than no record and (ii) better no record than an incorrect record. The first principle highlights the importance of every single record and is absolutely necessary in order to prevent bias and loss of information,

especially in the case of commoner species. When a dragonfly species becomes “too ordinary and common” to be noted in the researcher’s field book with at least basic details, the universal meaning of faunistic work and research is largely lost and often turns only into a quest for rarities.



General research coverage and age structure of data on the dragonfly fauna of Sri Lanka—localities with dragonfly records in the periods 1850–1920 (top left), 1921–1990 (top right), and 1991–2013 (bottom left) and a summary map of all localities for the period 1850–2013 (bottom right).

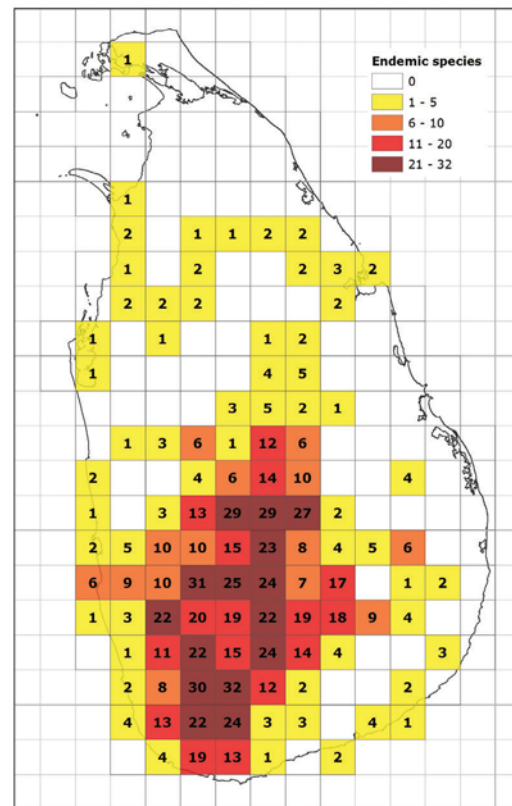
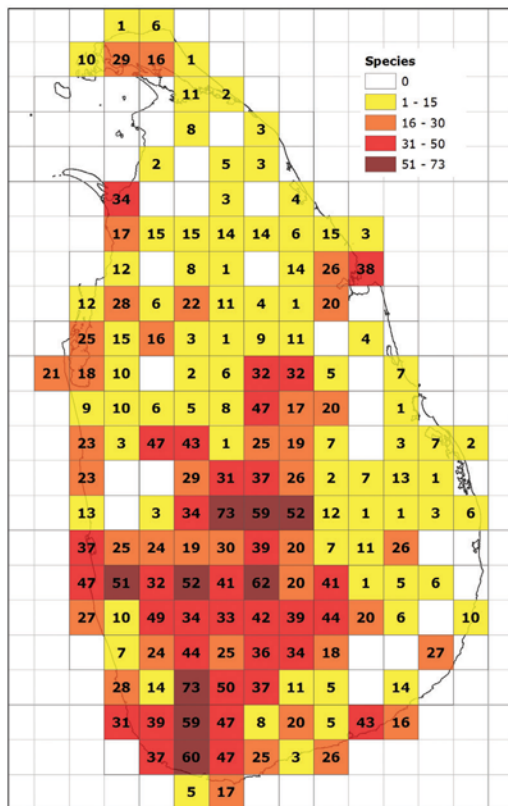
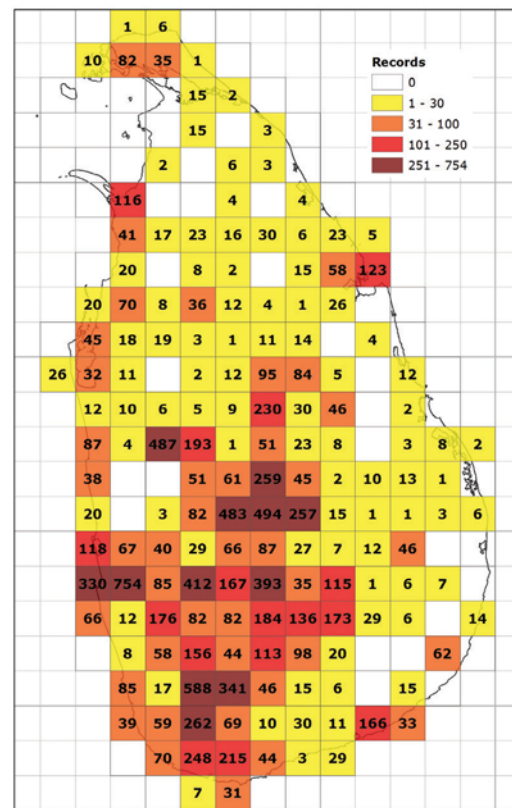
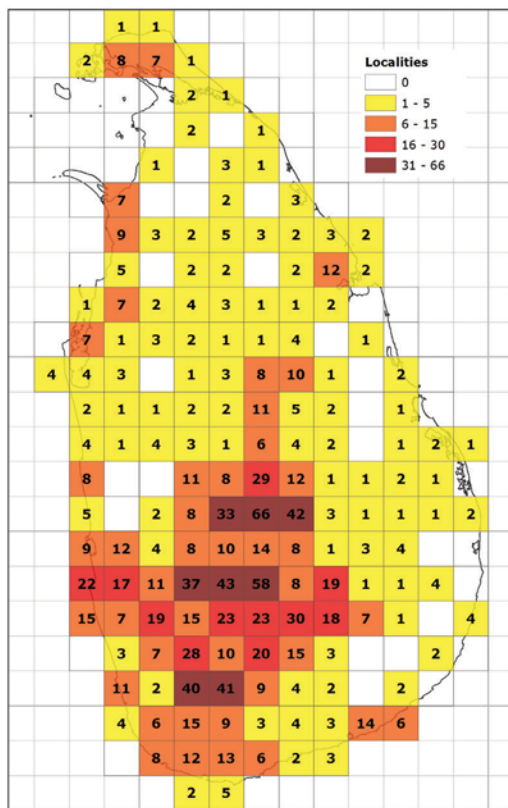
On the other hand, all records have to be accurate, reliable and well documented, especially as regards the correct identification of species and the noting of complementary data such as the date and location coordinates. In the case of poorly known or rare species, even a single wrong record can misdirect research. If an incorrect determination which leads to a disjunct distribution record or an unusual habitat type is reported and published for a species, it can take decades for subsequent researchers to correct the error. While every faunistic database contains some hidden misidentifications and mistakes, the authors have devoted much time and effort to eliminate or minimize these errors. In many cases this was obligatory in order to solve several taxonomic puzzles and make the correct identifications. The majority of old museum collections have been checked for this reason. Special attention should be paid in subsequent faunistic work to proper documentation, incorporating the same basic principles mentioned above.

While the consistency and reliability of data can be marked on the positive side of the quality scale, our work definitely has several drawbacks. The major drawback is the rather poor general coverage of Sri Lanka as a whole and the uneven distribution of research intensity. This is evident even from large-scale overview maps depicting localities with dragonfly records in the period 1850–2013 and becomes much more obvious at a finer scale. Similar to the number of dragonfly records collected in different periods from 1850 to 2013, also the age structure of dragonfly localities shows the same trend. The number of localities sharply increased in the last two decades. Whereas only 56 localities originate from the 1850–1920 period and an additional 374 localities from the 1921–1990 period, another 807 localities were added in a short period over the last twenty years. However, many important gaps still remain even though field coverage has improved in the past two decades and large areas without old dragonfly records have been surveyed in the last two years.

In order to obtain additional insights into the coverage of current research, some basic analyses were performed on the data and are presented on next page. For this purpose the Universal Transverse Mercator (UTM) grid system was deployed and a map of 20x20-kilometre grid squares, each measuring 400 square kilometres, was used as the basic layer for a general presentation of the results. Out of a total of 214 squares covering Sri Lanka, there are currently 160 squares with dragonfly records, which amounts to around 75%. Even if this result is fine for the present purpose, it should not be viewed with a sense of contentment. By changing the scale, e.g. to 10x10-kilometre grid squares, more blank and yellow squares would appear. All these areas are clearly odonatological mapping targets for the future.

Further, the research state of individual grid squares varies greatly. This is depicted numerically and graphically in the cluster of maps showing the number of odonatological localities, the number of odonatological records, the number of recorded dragonfly species and the number of recorded endemic dragonfly species in individual 20x20-kilometre grid squares. It is clear that fieldwork in the past has been largely directed towards the central and southwestern parts of the island, which are the richest in terms of endemic biodiversity. Even though only a few grid squares remain blank, it has to be stressed that the yellow squares generally represent records of only a few species and that these areas have not been systematically studied.

In certain regions only a small proportion of potential dragonfly habitats have been surveyed. Even if we exclude the dry zone which covers a large portion of the northern and northeastern part of the island and which has fewer natural dragonfly habitats, and large areas all around the island which are under heavy human impact, insufficient field coverage in many areas still remains a drawback. Only more fieldwork and research can improve the situation.

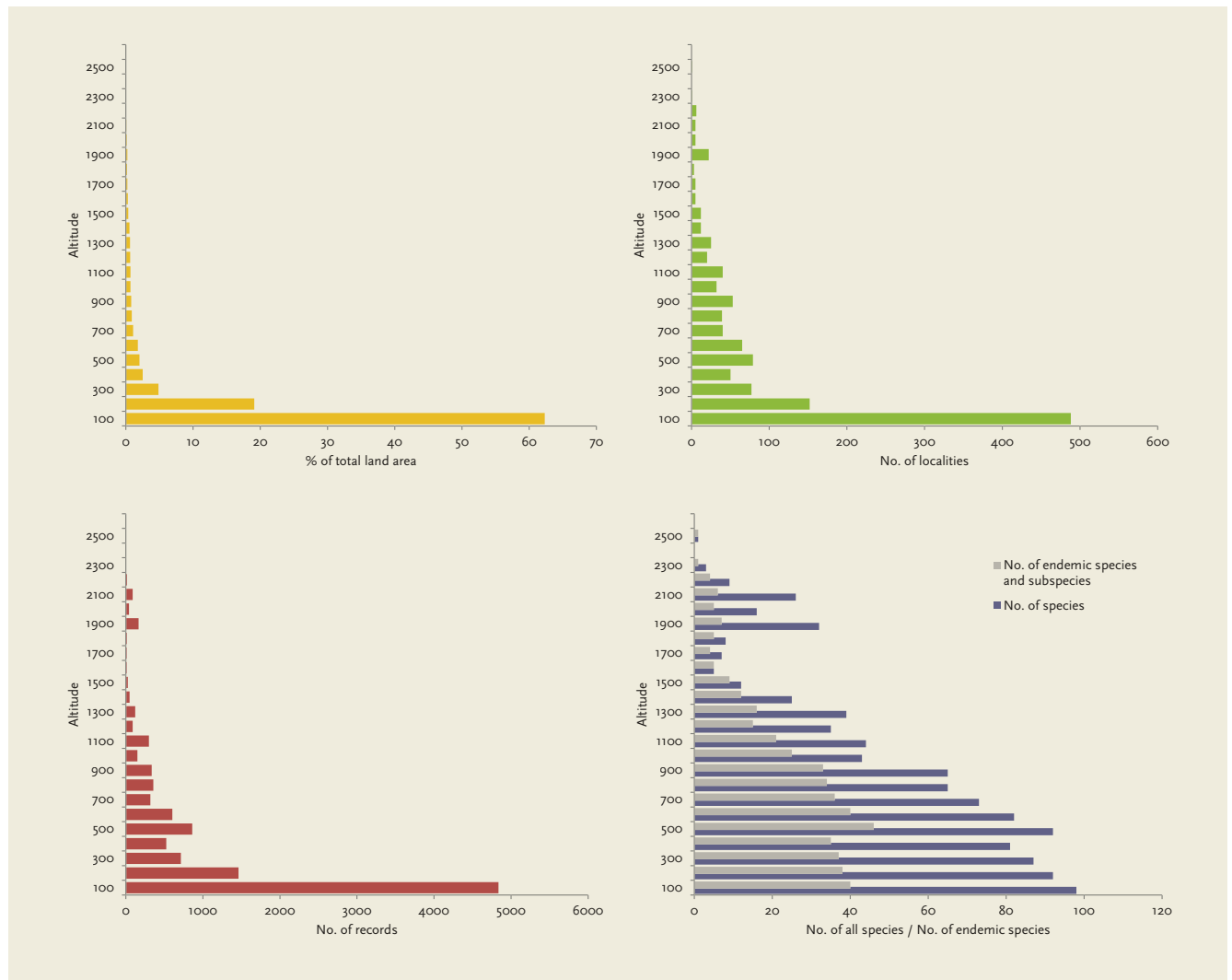


Map of Sri Lanka indicating the number of localities of odonatological records (top left), the number of odonatological records (top right), the number of dragonfly species (bottom left) and the number of endemic dragonfly species (bottom right) per 20x20-kilometre square.

In addition to the spatial coverage of the dragonflies of Sri Lanka, two other dimensions of the occurrence of dragonflies were analysed—altitude and seasonal phenology.

In the database, each of the georeferenced localities has an assigned altitude value. Where the altitude has not been specified in the original record, it has been

derived and extracted from spatial topography layers with the help of GIS software or determined with the help of Google Earth. In many cases, the altitude value inevitably shares the inaccuracy of the locality itself. Most recent records, however, include accurate readings determined in the field with a GPS device.



Altitude and distribution of the dragonfly species—percentage of Sri Lanka's land area according to altitude (top left), number of odonatological localities according to altitude (top right), number of dragonfly records according to altitude (bottom left) and number of all species and of endemic species and subspecies according to altitude (bottom right).

Altitude can be an important factor in the distribution of a species and indeed there are certain species that have a distinct lowland character and others that occur predominantly in the hills and mountains. However, many species fall somewhere

in-between and can be found at different altitudes as long as there is a suitable habitat. As shown in the charts above, the topography of Sri Lanka is unevenly divided among the different altitude classes. Lowlands below 100 metres altitude occupy more

than 60% of the land area. The chart of the number of odonatological localities according to altitude and the chart of the number of dragonfly records according to altitude both follow the general topography suggesting that the different altitudes were relatively evenly surveyed, with the minor exception of the higher hills between 1,500–1,900 metres altitude.

Nevertheless, the interpretation of the summary chart of the number of dragonfly species according to altitude is not straightforward and the general impression of the decreased dragonfly diversity with rising altitude is somewhat misleading. Although the majority of the island's surface lies below 300 metres altitude and the number of recorded species is the greatest here in general, the abundance of different dragonfly habitats and high species diversity are in fact unevenly distributed, the wetter lowlands of southwestern Sri Lanka contributing most to the high number of recorded species. On the other hand, at higher altitudes, the abundance and the diversity of dragonfly habitats is reduced, particularly of lentic biotopes which are very scarce. The exceptions, indicating the connection of abundance of species with the presence of different habitats, are the marshes and lakes around Nuwara Eliya at the altitude of nearly 1,900 metres, which enable survival of some common and typical lentic species met regularly in the lowlands. In the hilly regions, due to the lack of stagnant waters, the dragonfly species that inhabit seeps, streams and rivulets prevail. The diversity of the endemic dragonflies is the highest at the altitude range between 100–900 metres, with each of these altitude classes having more than 30 endemic species and subspecies on its list. Charts of the altitudinal distribution of each species are presented in the individual species' accounts that follow in continuation of CHAPTER 6.

Seasonal phenology is an important dimension of the occurrence of a species that was also analysed. Although the climate of Sri Lanka is mostly tropical and without marked fluctuations in average temperatures, precipitation varies greatly and different parts

of the island are affected differently by the southwest and northeast monsoons in part due to the island's heterogeneous topography. Almost nothing has been known about the seasonal phenology of individual species. However the larger dataset has made it possible for the first time to elaborate on the phenology charts for each individual species. The results show that many species, particularly the endemics, are clearly seasonal.

However, interpretation of the phenology charts must take into account that the data for many species are still very scarce and that the seasonal occurrence pattern of an individual species may be different in different parts of the island. As evident from the overview chart of the total number of dragonfly records collected in individual months on the next page, seasonal coverage is far from perfect. While the period from December to February is known not to be the best for many species, especially the endemics, which mostly tend to fly from April to November, the general lack of field surveys between June and September is a clear drawback of our work and one of the main targets for future surveys.

Knowledge on the phenology of a species is crucial in order to do targeted field surveys and to monitor individual species. This is of special importance for the many endemic species that are threatened. In general, the season of occurrence of most endemic species stretches from April through November. The second phenological summary chart shows the percentage of records per month that are of endemic species. This chart also shows the problem of summarizing and interpreting data in relatively small and also otherwise biased datasets. The surprisingly low percentage of records of endemic species in June is a consequence of the small amount of data but also reflects the fact that surveys were to a large extent carried out in regions that are not the centres of dragonfly endemism. Indeed, many extremely interesting questions remain regarding the phenology of individual dragonfly species in Sri Lanka.



Number of records per month indicating exploration of the dragonfly fauna of Sri Lanka. Total number of records collected in each month (top), with a calculation of the relative monthly percentage of collected records for endemic dragonfly species (bottom).

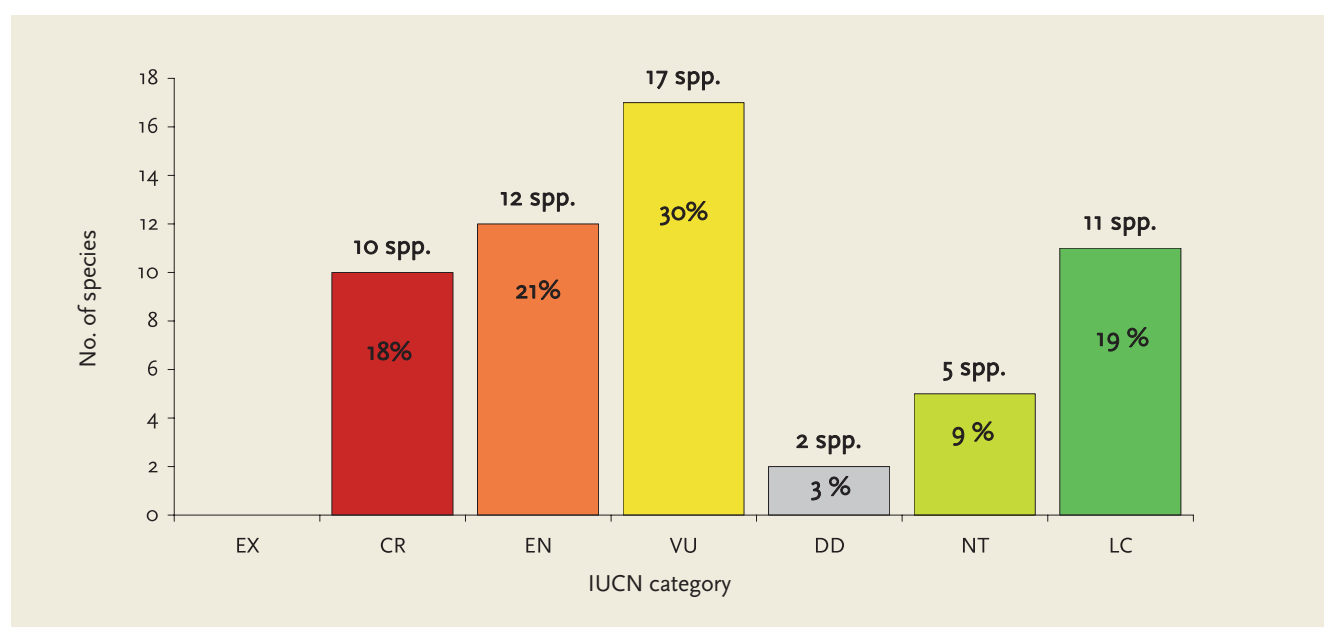
One very important aspect of the present work has been the documentation and assessment of the threat status of all 57 described endemic dragonfly species and subspecies from Sri Lanka. All assessments of threat status were conducted in line with the *IUCN Red List Categories and Criteria and Guidelines for Using the IUCN Red List Categories and Criteria* (IUCN 2012; 2013). In individual species accounts, the calculations of Extent of Occurrence (EOO) and Area of Occupancy (AOO) are provided together with the proposed IUCN Red List Criteria and the IUCN Red List Category. Both EOO and

AOO are important quantitative criteria in Red List assessments. Extent of Occurrence is defined as the area contained within the shortest continuous imaginary boundary that can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon. The Area of Occupancy is defined as the area within the EOO that is occupied by a taxon. AOO reflects the fact that a taxon will not usually occur throughout the area of its extent of occurrence. The AOO represents the area of suitable habitat currently known to be occupied by the taxon. With the help of GIS software, for each threatened

endemic species, the EOO has been outlined from its known distribution and is listed in square kilometres. For estimates of AOO, a uniform grid, with a grid size of 2 kilometres representing a cell area of 4 square kilometres has been used. The AOO values used in assessing the threat status have been obtained by tallying the total area of all occupied cells containing records of the species.

The results of the assessments are included in the individual accounts for all endemics. However, more details of the background of issues in nature conservation, a summary of assessments and

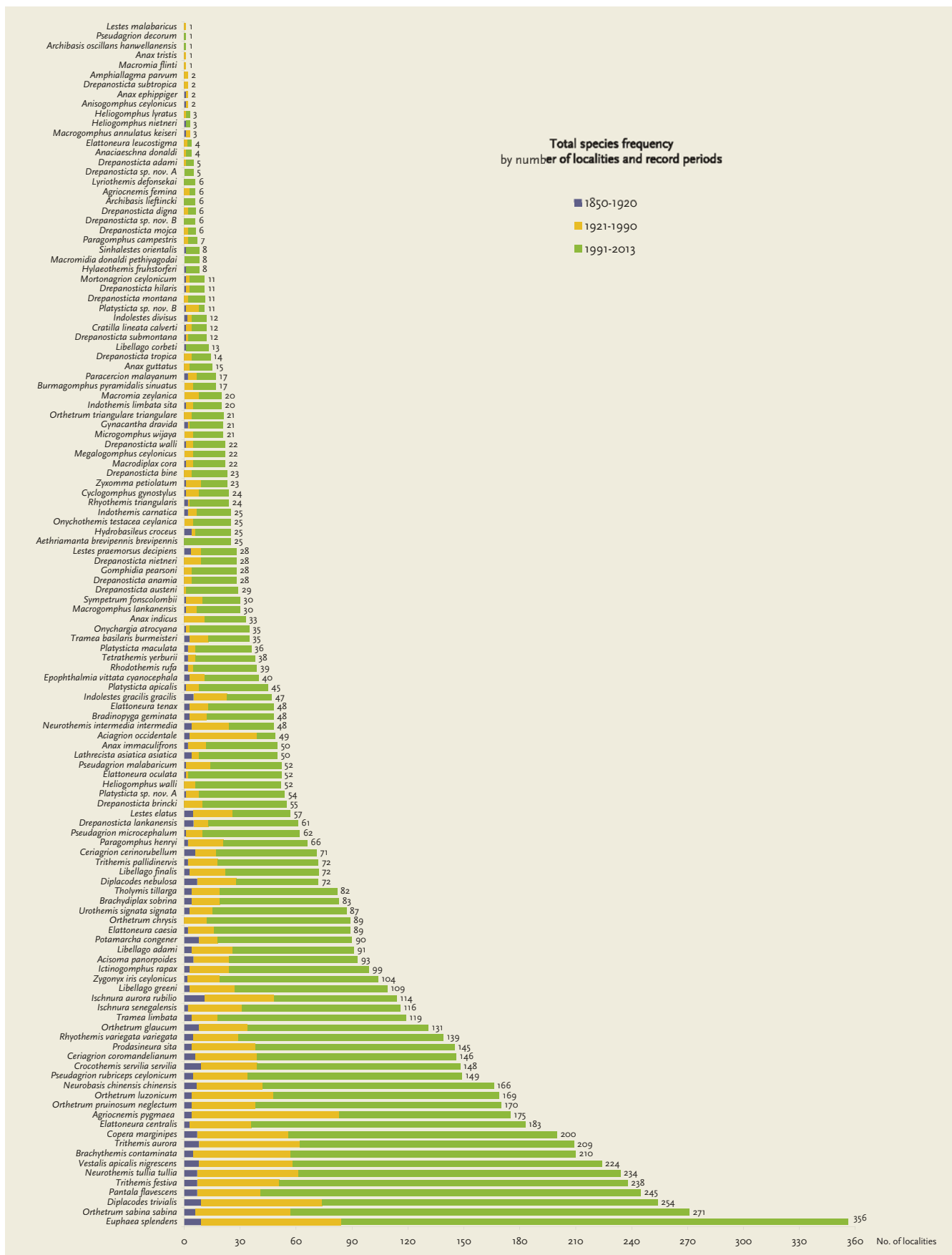
a broader discussion on the topic are provided separately in CHAPTER 7. As an alarming overall summary, clearly presented in the chart below, it can be pointed out that 39 out of 57 dragonfly species endemic to Sri Lanka—69%—have been assessed as globally threatened. This worrying situation is important on a global level when considering issues of biodiversity and conservation, particularly since most of the globally threatened taxa are restricted in their range and their known occurrence is limited almost exclusively to only a few isolated localities in the wet and intermediate zones of Sri Lanka.



Threat status of all 57 described endemic dragonfly species and subspecies from Sri Lanka—number and proportion of taxa in individual IUCN Red List Categories.

The last chart of the chapter serves as a transition to the eagerly awaited main contents of the book. It presents an overview of the known prevalence of all dragonfly species recorded from Sri Lanka. In the chart, the total number of localities is indicated for each species as well as the number of its localities per period: 1850–1920, 1921–1990 and 1991–2013. The amount and importance of the work carried out mainly since the break of the millennium is clearly evident by abstracting the green colour

from the chart. The number of known localities for many species that were previously considered very rare has increased considerably recently. However, there are still 8 species that have not been recorded in Sri Lanka since 1991, with the last records decades old—they are still considered extremely rare viz. *Lestes malabaricus*, *Amphiallagma parvum*, *Drepanosticta subtropica*, *Anax tristis*, *Anax ephippiger*, *Anisogomphus ceylonicus*, *Macrogomphus annulatus keiseri* and *Macromia flinti*.



In this book, all 124 dragonfly species hereto recorded from Sri Lanka are individually presented by text, photographs and graphics, comprising the available knowledge on their distribution, biology, phenology and threat status. They are ordered according to the family and species list presented in CHAPTER 5.

Throughout the book, the scientific names of species and subspecies are used and where appropriate, the author and year of description are also added. Common English names introduced by BEDJANIĆ et al. (2007) are also listed for every species, except for the four unnamed representatives of the family Platystictidae that are still in the process of description. It should be noted that contrary to systematic and strictly regulated scientific nomenclature, the common names of dragonflies are more or less well-chosen “nicknames” for popular use, which for certain species may vary in different publications and in different countries. Nevertheless, it is important that they exist and are published for all Sri Lankan dragonflies. However, learning the scientific names is highly recommended for anyone seriously interested in odonatology.

The individual species accounts are organized uniformly—a single page is used for non-endemic species and subspecies, while the island's endemics are presented in more detail on two pages. Each family is introduced by a short photographic prologue. Additional information on these photographs is found in APPENDIX 3.

Single-page accounts of the non-endemic species comprise general text, a distribution map, graphs of seasonal phenology and altitudinal distribution, a chart indicating the number of localities and records, and one photograph. In the distribution map, the records that originate prior to 1991 are marked with yellow dots while the newer records collected between 1991 and 2013 are marked with red dots. In the altitudinal graph, the percentage of localities for the species per 100-metre altitude class is presented in blue while the percentage of all dragonfly localities is presented for comparison in light blue. Similarly, in the seasonal phenology chart, the relative proportion of records of the species in each month is presented in red whereas the percentage of all dragonfly records is in pale red.

This provides an overview of the uneven seasonal research intensity for comparison and help in data interpretation.

All photographs of the non-endemic species, except for that of *Anax tristis*, are of living insects taken in nature. In most cases an adult male is depicted, or both sexes in tandem or in copula. APPENDIX 3 gives additional information on the photographs as well as photographs of the opposite sex which have been included for completion of information and comparison.

Two-page accounts of the endemic species are organized similarly but with more detailed information. The text is longer, comprising more detailed insights into the biology, distribution and threat status of these species that are confined to Sri Lanka. Distribution maps as well as graphic presentations of seasonal phenology, altitudinal distribution and number of localities and records are organized in the way already described above. In addition, the percentage of records per period is included whereby the violet bar represents the percentage of records collected in the period between 1850–1920, while the grey bar and the green bar mark the proportion of records collected in the periods between 1921–1990 and 1991–2013, respectively.

Another additional dataset relates to the assessments of threat status of all 57 described endemic dragonfly species and subspecies from Sri Lanka according to the IUCN Red List Criteria and Categories (IUCN 2012; 2013). In individual species accounts the calculations of Extent of Occurrence (EOO) and Area of Occupancy (AOO) are provided together with the proposed IUCN Red List Criteria and the IUCN Red List Category.

Finally, for every endemic species, a complete synopsis of all known references and synonymy is provided. Literature cited is listed in the bibliographical entries of CHAPTER 10 which presents a complete odonatological bibliography of Sri Lanka. Last but not least, a reference to APPENDIX 2, which brings together all known faunistic information for individual species, is given for the 39 species assessed in the present publication as globally Critically Endangered, Endangered or Vulnerable according to IUCN Red List Criteria and Categories, as well as for the 2 species assessed as Data Deficient.

Two photographs are presented for each endemic, usually depicting both sexes—the male above and the female or a pair in tandem or in copula below. In rare instances an exuvium or only a male is depicted. A single photograph of a male is provided for the four representatives of the family Platystictidae that are in the process of description. Photographs of several species are made available in the present book for the first time ever. With the exception of

Drepanosticta subtropica, *Anisogomphus ceylonicus*, *Macrogomphus annulatus keiseri* and *Macromia flinti* where only type specimens from museum collections are known, all other photographs were taken in nature and depict the beautiful colourations of these live insects. Additional information on the individual photographs is found in APPENDIX 3 where additional photographic material is included for a few species.





CALOPTERYGIDAE

Jewelwings







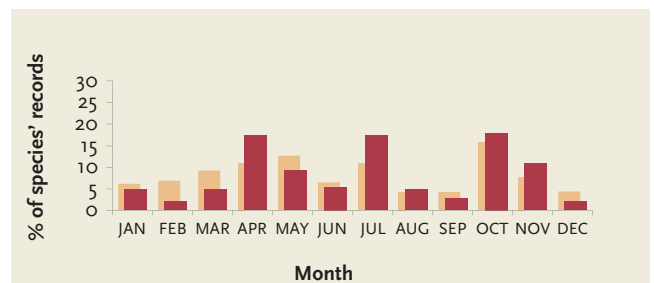
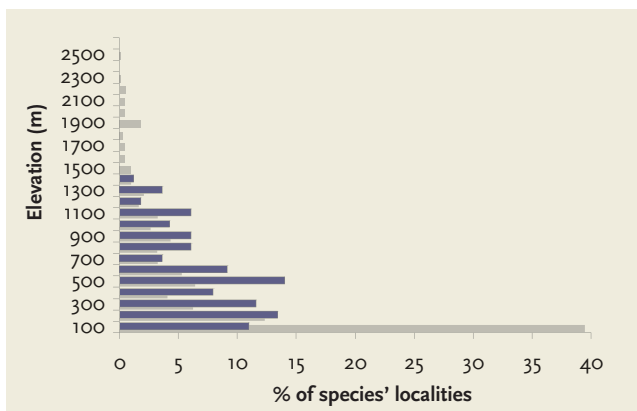
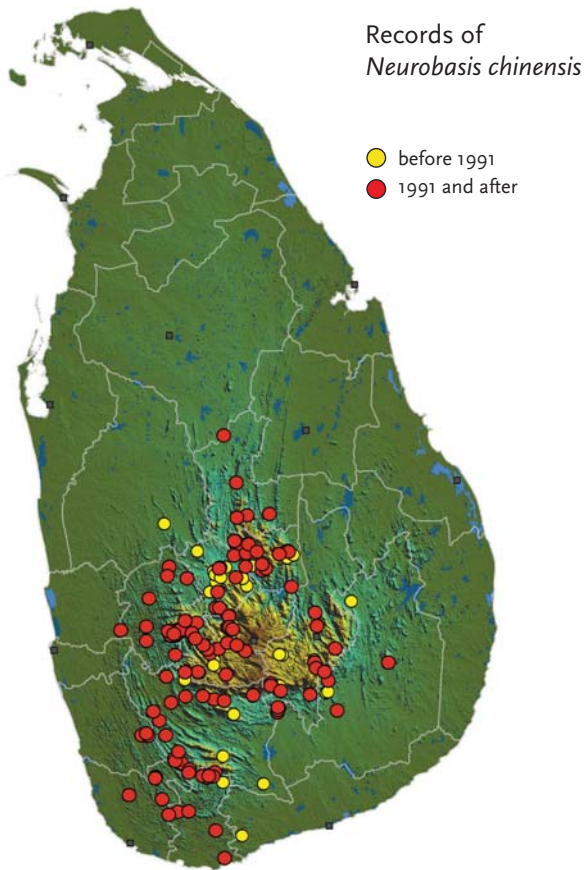
Neurobasis chinensis chinensis Linnaeus, 1758

Oriental Green-wing

One of the most elegant and beautiful stream-dwelling damselflies in Sri Lanka is *Neurobasis chinensis*. Large in size, with bright colours and long delicate legs, it is easily spotted on stones in mid-stream and on overhanging tree branches almost all year around.

A dark metallic green body and green tinted wings are characteristics of males, while female colours vary from bronze to metallic green with cream-coloured pterostigmas and nodes in bronze-tinted wings. They will often submerge in the water to lay their eggs in soft water plants. Males are amazing in flying strikingly low and fast above the water surface, with flashes of emerald green and peacock blue often being the only sign of their flight to the observer.

N. chinensis is widely distributed in southeast Asia. In Sri Lanka, it avoids the lowlands of the dry zone but in the central and southwestern part of the island it is common in hill areas near forested streams and rivers.



Number of all localities: 166

after 1990: 124

Number of all records: 198

after 1990: 144

Vestalis apicalis nigrescens Fraser, 1929

Black-tipped Demoiselle

ENDEMIC



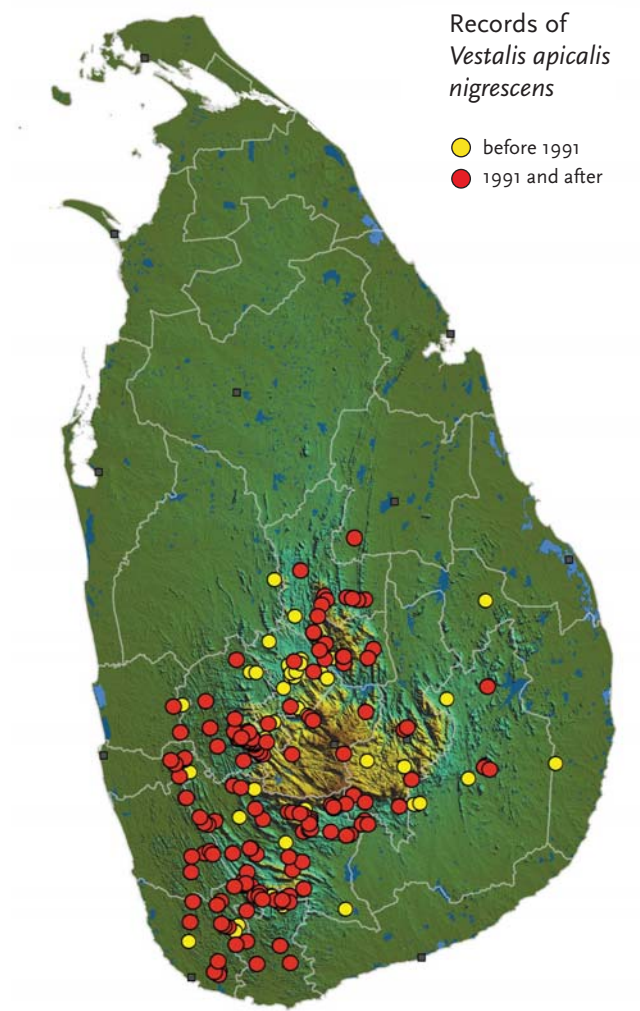
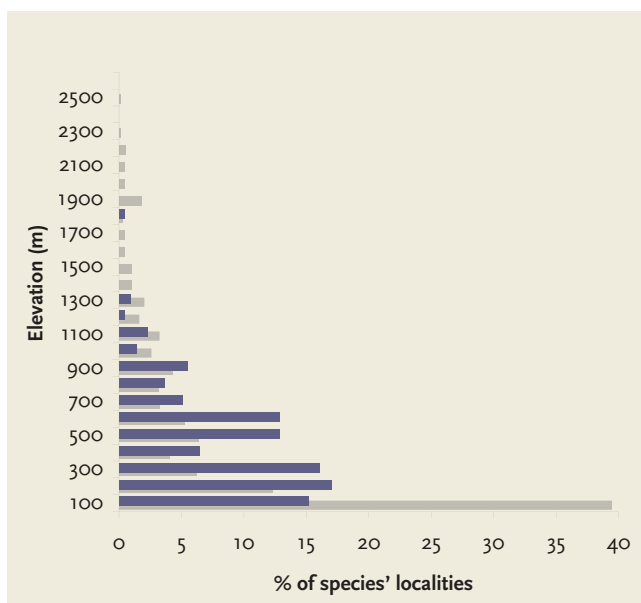
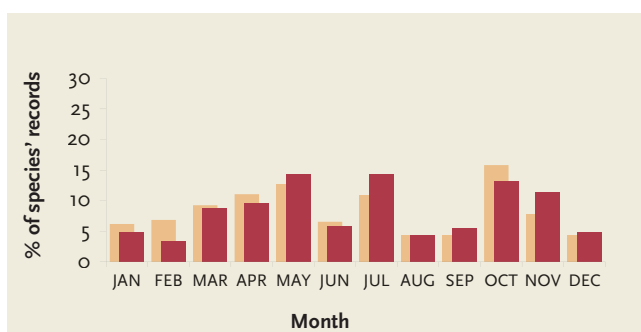
Although not so brightly coloured as the preceding member of the Jewelwings, *Vestalis apicalis nigrescens* is another handsome damselfly often met in numbers along forested streams and rivers in the central and southwestern part of Sri Lanka.

It is closely related to *V. apicalis* in India, however, FRASER (1929b) described the Sri Lankan material as a separate species, naming it *V. nigrescens* because of the black labrum, antennae and legs and non-metallic abdomen. By studying live insects including juvenile and teneral forms, LIEFTINCK (1940) showed that the colour differences are much less pronounced and that only a subspecific status may be retained for the insular populations.

Dark metallic green body and hyaline wings with black coloured apices, eloquently reflected in its Latin species name, are characteristics of adult males. Females are slightly smaller, wings are clear or evenly tinted smoky brown, and as in juvenile males they lack the black tip on the wing. Along lively streams and rivulets, *V. apicalis nigrescens* is often found together with *Euphaea splendens* and

Neurobasis chinensis, however, it differs strikingly from both sun-loving companions in its habits by modestly keeping closely to the bushes and grasses on the banks. Here, males and females, often in groups, are seemingly carelessly resting together. Courtship, mating or oviposition are only rarely observed and are poorly studied. Unlike *Neurobasis*, females lay their eggs in blades of grass or stems overhanging a stream and do not submerge. Larvae live along roots and twigs in the water, with their characteristic elongate and narrow body and long legs superficially resembling a stick insect.

Older data don't allow any estimation of the population trends of this endemic subspecies, but based on its currently known range and numerous strong populations, *V. apicalis nigrescens* is assessed as a not endangered Sri Lankan endemic.



| | |
|--------------------------------------|------------------------|
| Number of all localities: 224 | after 1990: 166 |
| Number of all records: 295 | after 1990: 211 |

| |
|--|
| Extent of Occurrence (EOO): 20,492 km² |
| Area of Occupancy (AOO): 712 km² |

% of records per period:

1850-1920 1921-1990 1991-2013

| | | |
|----------|-----------|-----------|
| 5 | 23 | 72 |
|----------|-----------|-----------|

IUCN Red List Criteria: NOT APPLICABLE

IUCN Red List Category: LEAST CONCERN

References & Synonymy:

Vestalis nigrescens, Fraser, 1929, J. Bombay nat. Hist. Soc. 33: 584-585.

Calopteryx (Vestalis) amoena - HAGEN (1859): 206; *Neurobasis apicalis* - KIRBY (1891): 204, pl. XX, figs. 2, 2a; *Vestalis apicalis* - KIRBY (1894): 546, 558-559; KIRBY (1905): 272; LAIDLAW (1924): 355-356; *Vestalis nigrescens* - FRASER (1929b): 584-585; FRASER (1934): 125, 131-132; *Vestinus apicalis nigrescens* - LIEFTINCK (1940): 81-82; *Vestalis (Vestinus) apicalis nigrescens* - LAIDLAW (1951): 80; LIEFTINCK (1955): 69; *Vestalis apicalis nigrescens* - FERNANDO (1964): 190; LIEFTINCK (1971): 189, 206; COSTA & STARMÜHLNER (1972): 56; ST. QUENTIN (1973): 115, 123, fig. 5; DAVIES & TOBIN (1984): 10; STARMÜHLNER (1984): 224, 230; TSUDA (1986): 79, 220; FERNANDO (1990): 186; TOL (1992): 163; BEDJANIĆ (1998): 9, 15, 19, 58, 63-64, 75, 79 – app. 5.1.B; DE FONSEKA (2000): 11, 33-35, 223, 283, pl. 1; DE SILVA WIJAYERATNE et al. (2003): pl. 1; BEDJANIĆ et al. (2006): pl. 1; BEDJANIĆ et al. (2007): 15, 30-31; WCSG (2008): 15; WCSG (2009): 14; DOW (2009a): www.iucnredlist.org; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 5;





CHLOROCYPHIDAE

Jewels

Libellago adami Fraser, 1939

Adam's Gem

ENDEMIC

The common English name of the *Libellago* are the Jewels or the Gems—even the darker coloured ones have a glimmer about them. All are characterized by having wings longer than the abdomen, by a curious upturned 'nose', scientifically called a rhinarium, and forewings in males are tipped black. All four members of the Chlorocyphidae in Sri Lanka are endemic to the island.

Libellago adami is characterized by the long humeral stripe in both sexes. The male has many yellow markings on the prothorax and the abdomen is black with bright grass-green dorsal markings and yellow lateral markings, the terminal segments are black. Females of the four species are harder to differentiate but the female of *L. adami* has a rhinarium that is broadly marked with yellow, which, in combination with a long humeral stripe leaves little doubt of the species' identity. Males can only be confused with *L. fnalis*, which is markedly larger and has less extensive greenish markings on the dorsum of the abdomen. It is also worth mentioning the work of HÄMÄLÄINEN et al. (2009) who showed that old records of *L. lineata indica* for Sri Lanka actually refer to *L. adami*. Thus the former has been deleted from the island's species list.

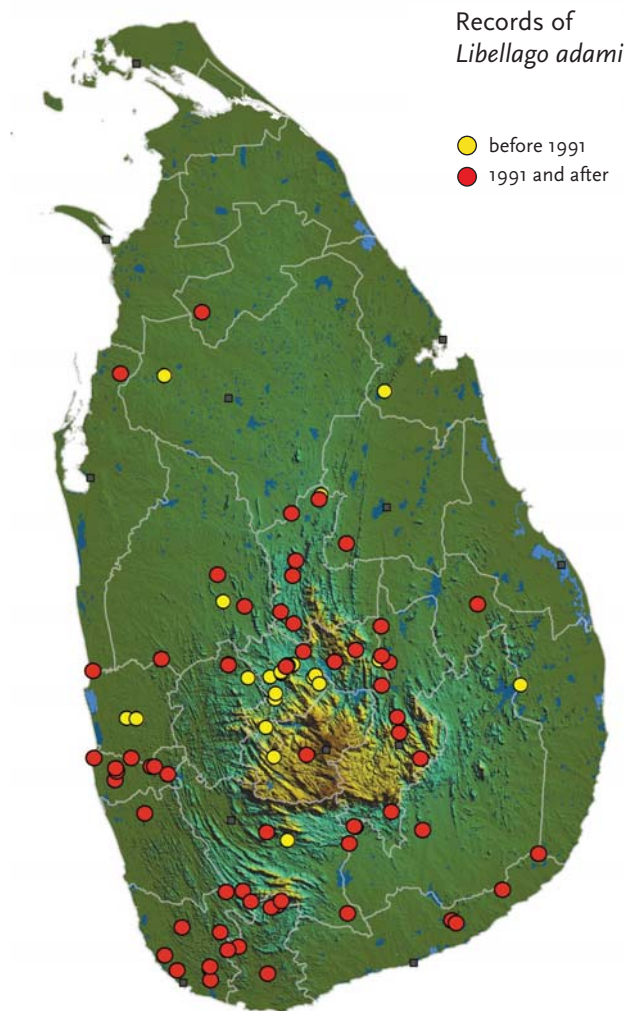
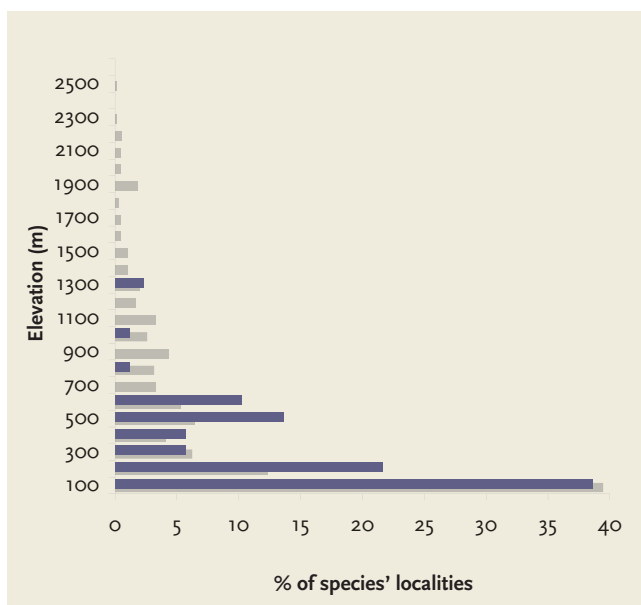
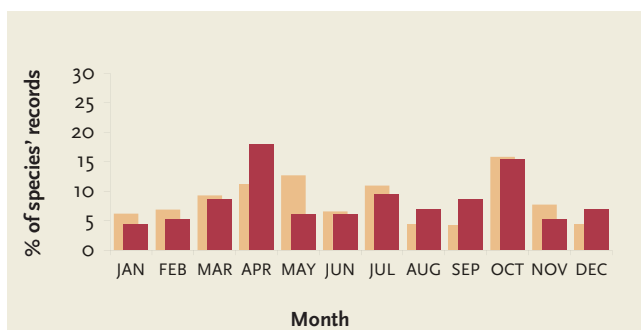
Based on the number of records and extent of occurrence, *L. adami* is the most common representative of the genus in the island and can be seen at many different water sources including rivers and irrigation canals. It seems to have no preference for either fast or slow-moving water, and can be



found from the dry or wet lowlands to the mid-hills, although the vast majority of records originate from the plains.

Males of *L. adami* are quite pugnacious and territorial, non-contact battles are common. They display their white legs to each other as they spar head to head. Females tend to remain on the sideline, quietly sitting on a branch high above the water. Courtship and mating are rarely observed but females spend a lot of time ovipositing. They lay their eggs on twigs, branches or plants in or on the water, spending time to insert the eggs into the material with their large ovipositor. Several females are often seen at the same place laying their eggs.

This small Gem obviously copes quite successfully with various anthropogenic influences on the flowing waters of Sri Lanka. Globally, it is not endangered and thus best fits into the IUCN category of Least Concern.



| | |
|------------------------------|----------------|
| Number of all localities: 91 | after 1990: 65 |
| Number of all records: 132 | after 1990: 95 |

| |
|--|
| Extent of Occurrence (EOO): 41,615 km ² |
| Area of Occupancy (AOO): 324 km ² |

% of records per period:

1850-1920 1921-1990 1991-2013

| | | |
|---|----|----|
| 6 | 22 | 72 |
|---|----|----|

IUCN Red List Criteria: NOT APPLICABLE

IUCN Red List Category: LEAST CONCERN

References & Synonymy:

Libellago adami, Fraser, 1939, Proc. R. ent. Soc. Lond. (B) 8(2): 23, 24, figs. 1a-1c.

Libellago adami - FRASER (1939): 23, 24, figs. 1a-1c; LIEFTINCK (1955): 68; FERNANDO (1964): 190; KIMMINS (1966): 177; LIEFTINCK (1971a): 189, 206; LIEFTINCK (1971b): 70, 100; DAVIES & TOBIN (1984): 17; FERNANDO (1990): 186; TOL (1992): 27; DE FONSEKA (2000): 11, 39-42, 202, 223, 283, figs. B6a-c; BEDJANIĆ (1998): 10, 15-16, 19, 58, 63, 64, 67, 75; IUCN SRI LANKA (2000): 24; BEDJANIĆ (2002): 5-6, 8; DE SILVA WIJAYERATNE et al. (2003): pl. 1; BEDJANIĆ (2004): 283; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2006): pl. 1; BEDJANIĆ et al. (2007): 15, 34-35; WCSG (2008): 12, 15; WCSG (2009): 14; HÄMÄLÄINEN ET AL. (2010): 3-5; VAN DER POORTEN (2011a): 18-19; VAN DER POORTEN (2011c): 70; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 3, 5; *Libellago miae* - LIEFTINCK (1940): 81, 84-88, 117, fig. 1; GEIJSKES & KIAUTA (1984): 24; TSUDA (1986): 66, 218; TOL (1992): 153;

Libellago corbeti van der Poorten, 2009

Ebony Gem

ENDEMIC

Perhaps the least colourful of the Gems, *Libellago corbeti* nevertheless shines in its mostly black colouring. This beautiful endemic species was described only recently by VAN DER POORTEN (2009c). It is named after well known odonatologist P. S. Corbet who contributed immensely to the understanding of dragonflies and inspired many amateur and professional scientists.

The species is very peculiar in having no humeral stripe and the male is almost entirely black, except for young males which have some yellow markings. They cannot be mistaken for any other Sri Lankan species. Females are more like their congeners, but are characterized by having a rhinarium that is entirely black, a narrow yellow antehumeral stripe and a yellow basal and apical spot usually separated on each segment of the abdomen.

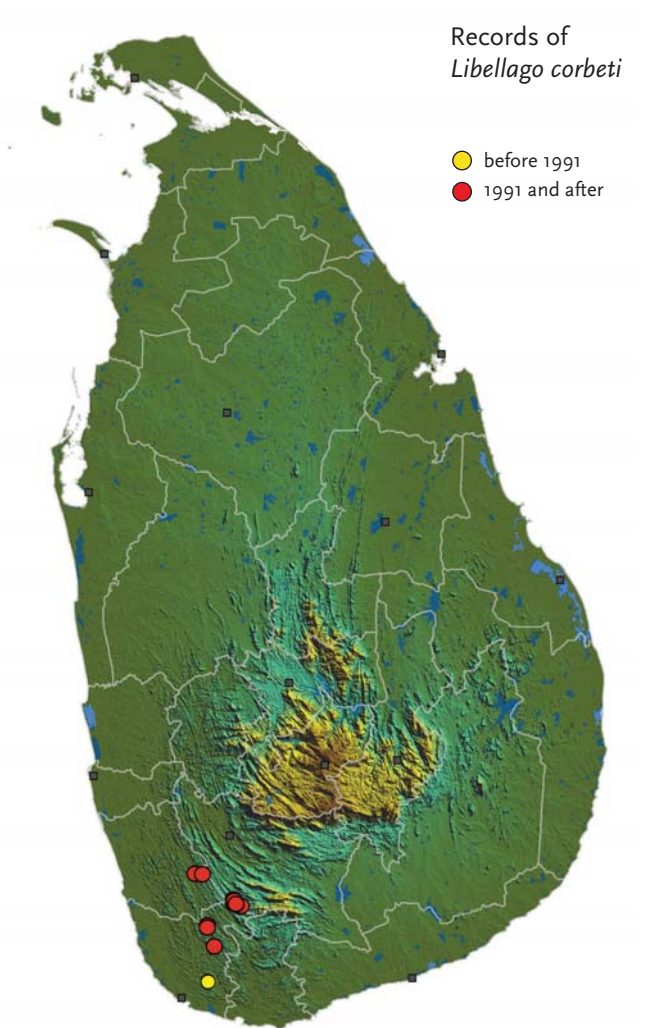
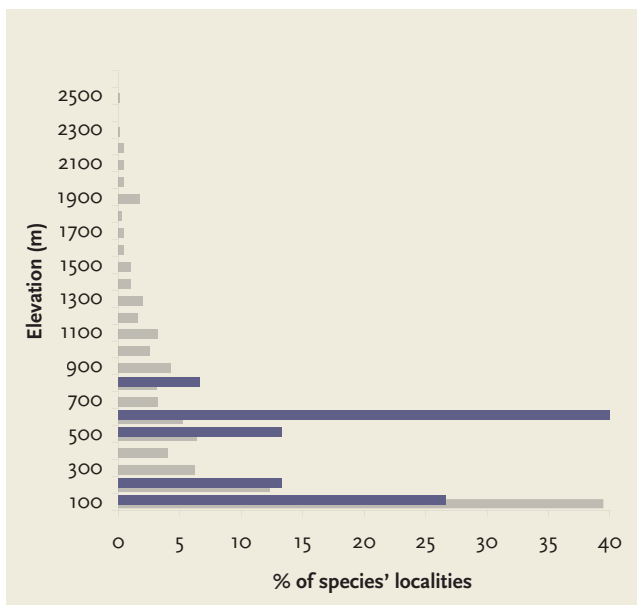
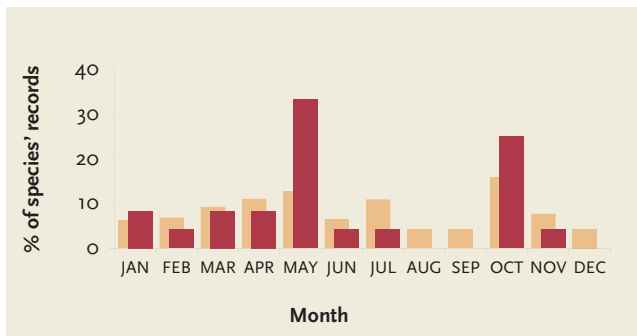
The range of *L. corbeti* is very small and it is confined to the few still preserved forests in the southwestern part of the island. All its known records, contributed by different observers, have been summarized by VAN DER POORTEN (2011a), who listed the species from a few quite closely lying localities in Sinharaja Forest Biosphere Reserve near Kudawe entry point up to the Research Station, from Kanneliya and Morapitiya Forest Reserves and the Haycock range near Hiniduma. In addition, a century-old museum record exists from Kottawa, most probably from the Kottawa Forest Arboretum near Galle.

The habits of *L. corbeti* are similar to the other Gems though it appears to be much more restricted



in its habitat requirements. As described above, the adult insects have been seen only in a few locations in the wet zone, along slow-moving, shady streams. Males have not been observed in territorial battles though they also have white legs. Females oviposit into plant material on the surface of slow-moving streams in shady forests.

Although the majority of this species' records come from protected forest reserves this doesn't mean an automatic guarantee for species survival in the decades to come, since sustained small scale clearing and encroachment of forests and ongoing expansion of tea plantations is still in progress. Also due to its small range, *L. corbeti* is threatened on the global scale. Nationally, it was declared recently as a Critically Endangered species (VAN DER POORTEN & CONNIFF, 2012), while globally it fulfils the IUCN Red List criteria for an Endangered species.



| | |
|------------------------------|----------------|
| Number of all localities: 13 | after 1990: 12 |
| Number of all records: 19 | after 1990: 18 |

| | |
|-----------------------------|---------------------|
| Extent of Occurrence (EOO): | 452 km ² |
| Area of Occupancy (AOO): | 40 km ² |

% of records per period:

1850-1920 1921-1990 1991-2013



IUCN Red List Criteria: EN B1ab(iii)+2ab(iii)

IUCN Red List Category: ENDANGERED

References & Synonymy:

Libellago corbeti, van der Poorten, 2009, *Int. J. Odonatol.* 12(2): 223-230, pl. V excl.

Libellago corbeti - VAN DER POORTEN (2009c): 223-230, fig. 1, pl. V excl.; VAN DER POORTEN (2011a): 18-19; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 1,3, 5;

Faunistic records: APPENDIX 2, page 292;

Libellago finalis (Hagen, 1869)

Ultima Gem

ENDEMIC

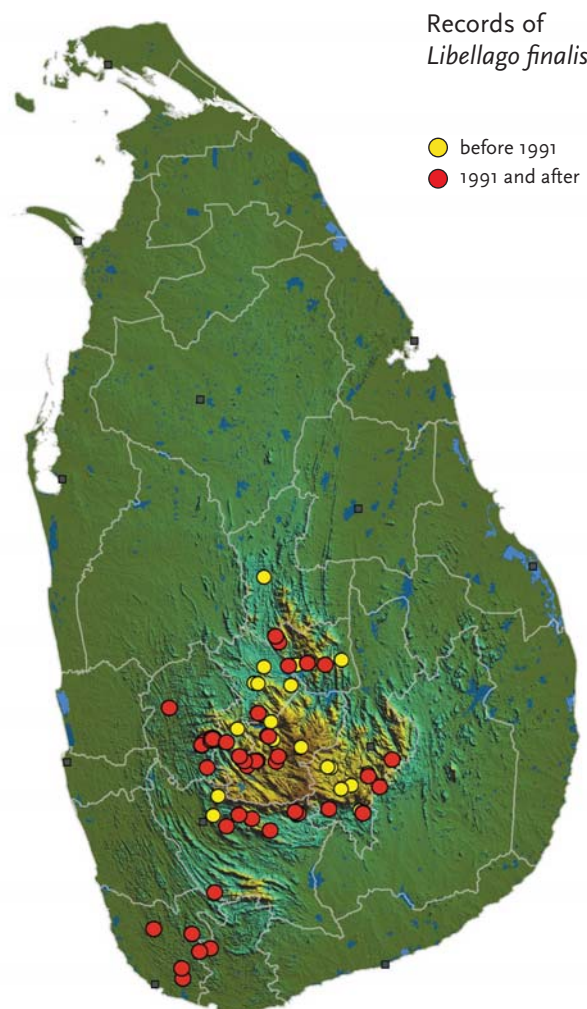
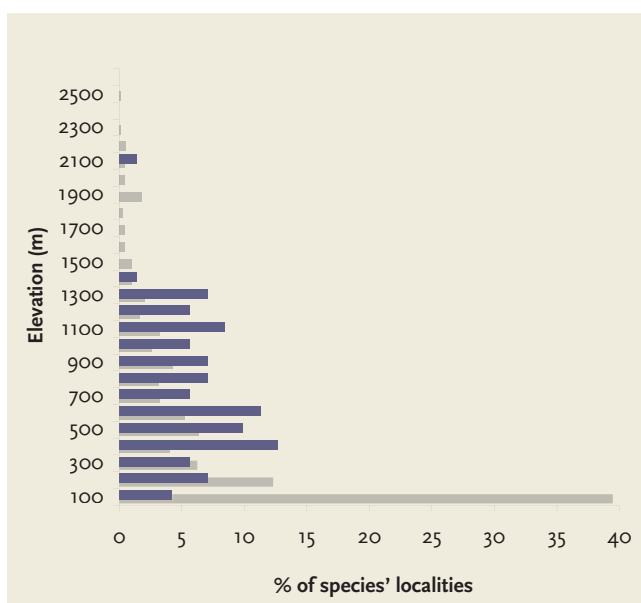
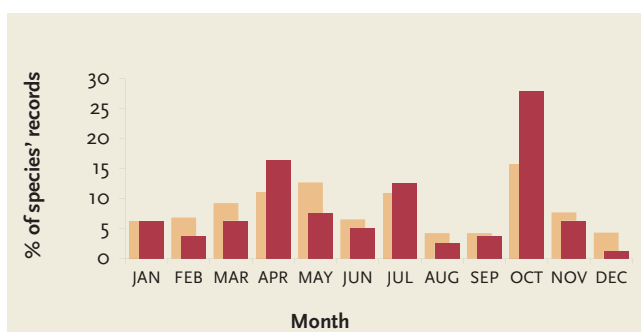
The first of the endemic Gems described from Sri Lanka by H. A. Hagen in Selys' "Additions au synopsis des Caloptérygines" was *Libellago finalis* (SELYS, 1869; 1973b). It is characterized by the very short humeral stripe and larger size but its general appearance is similar to the much later described *L. adami*. The male has fewer yellow markings on the prothorax and the abdomen has yellow dorso-lateral markings on the first six or seven segments only, while the remaining are completely black. The female has a few yellow spots on the rhinarium and the middle segments of the abdomen each have a narrow elongated spot that covers the entire length of the segment.

L. finalis is more restricted in its range than *L. adami*. Its populations are concentrated in the southern outskirts of Knuckles, in the central hills and surrounding areas, and in the southwestern hilly region north of Galle and Matara, in general at higher elevations than its congeners. The majority of records lie between 400–1,300 metres. An isolated record holder at an altitude of over 2,000 metres is an unpublished record by the researchers of the Smithsonian Institution, who found the species at Lovers Leap near Nuwara Eliya in March 1973 in the framework of the extensive "Ceylon Insect Project".



The species prefers shallow, somewhat slow-moving sections of mountain streams and it has often been recorded in streams and rivulets below waterfalls. Males are usually seen resting on a rock in the middle of the stream or on floating debris. Females prefer to remain on hanging vegetation above the stream. Adults can be met throughout the year, although April, July and October have a higher proportion of records.

As for the rest of its endemic congeners, almost nothing is known on the ethology and courtship behaviour of *L. finalis*, or on the biology of its larval stages. Despite very strong agricultural and anthropogenic pressures on streams and rivulets in the hilly regions of Sri Lanka, the species is not threatened on the global level yet. However, older reference data for comparisons and trend estimations are lacking and its conservation status should be monitored over the next decades.



| | |
|-------------------------------------|-----------------------|
| Number of all localities: 72 | after 1990: 50 |
| Number of all records: 86 | after 1990: 61 |

| |
|--|
| Extent of Occurrence (EOO): 10,325 km² |
| Area of Occupancy (AOO): 228 km² |

% of records per period:

1850-1920 1921-1990 1991-2013

| | | |
|----------|-----------|-----------|
| 5 | 24 | 71 |
|----------|-----------|-----------|

IUCN Red List Criteria: **NOT APPLICABLE**

IUCN Red List Category: **NEAR THREATENED**

References & Synonymy:

Micromerus finalis, Hagen in Selys, 1869, Bull. Acad. r. Belg. (2)27: 665.

Micromerus finalis - SELYS (1869): 665; SELYS (1873b): 616; KIRBY (1890): 115; KIRBY (1891): 204; KIRBY (1894): 560; KIRBY (1905): 272; FRASER (1923c): 479; LAIDLAW (1924): 351-352, fig.4; FRASER (1928): 688, 689, pl. I, fig. 4; *Libellago finalis* - FRASER (1934): 60, 67-68, fig. 21d; FRASER (1939): 24; LIEFTINCK (1940): 81, 83-84, fig. 1; LIEFTINCK (1955): 68; FERNANDO (1964): 190; LIEFTINCK (1971a): 189, 206; DAVIES & TOBIN (1984): 17; STARMÜHLNER (1984): 224; TSUDA (1986): 66, 218; FERNANDO (1990): 186; TOL (1992): 102; BEDJANIĆ (1998): 9, 15, 19, 58, 63-64, 67-75; DE FONSEKA (2000): 11, 37, 40-43, 202, 223, 283, figs. B7-B10; IUCN SRI LANKA (2000): 24; BEDJANIĆ (2002): 5-6, 8; DE SILVA WIJEYERATNE et al. (2003): pl. 1; BEDJANIĆ (2004): 283, 286; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2006): pl. 2; BEDJANIĆ et al. (2007): 15, 36-37; WCSG (2008): 15; WCSG (2009): 14; HÄMÄLÄINEN ET AL. (2010): 3-4; VAN DER POORTEN (2011a): 18-19; VAN DER POORTEN & CONNIF (2012) in MOE (2012): 5;

Libellago greeni (Laidlaw, 1924)

Green's Gem

ENDEMIC

Undisputedly, the title of the most colourful of the endemic Gems in Sri Lanka simply has to go to *Libellago greeni*. Its specific name does not refer to its colour but rather to its original collector, E. E. Green, the Government Entomologist in Sri Lanka at the beginning of the 20th century. The honour of having such a beautiful Gem named after him has been more than deserved—not only was Green a pioneer in studies of insect pests of tea, a skilled artist and prolific entomological writer, he also collected a wealth of animal specimens from all groups, including dragonflies. The groundwork publications of Sri Lankan odonatology were based on his collections (KIRBY, 1905; LAIDLAW, 1924).

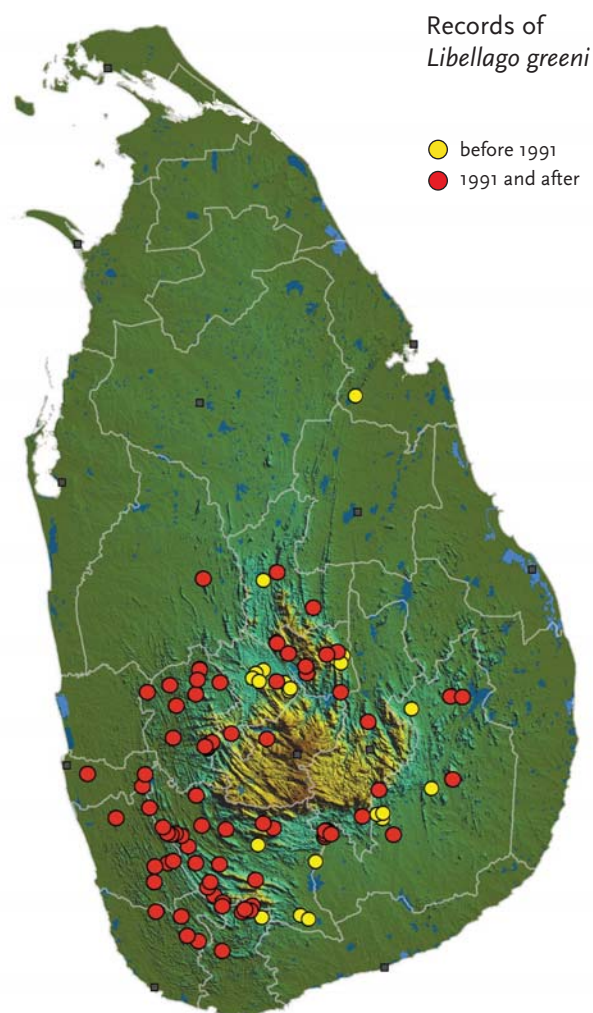
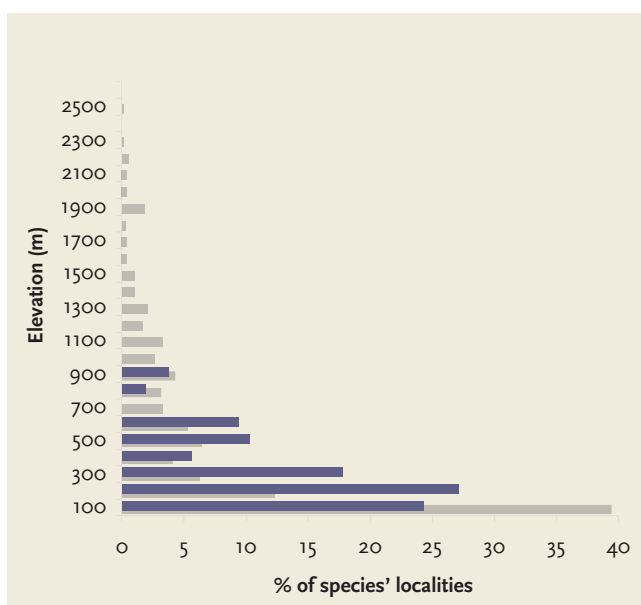
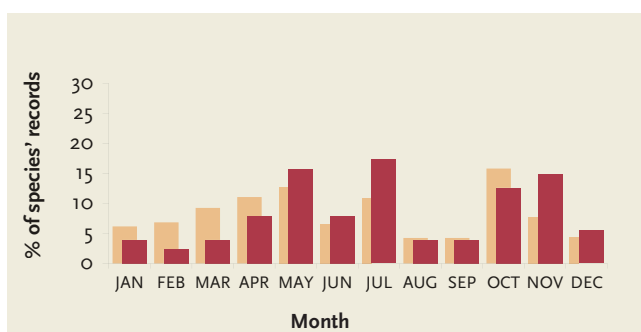
Returning to the small admirable *L. greeni*, its mix of bright orange-red, citron yellow and black, flavoured with snow white anterior faces of legs and metallic lusted patches on the wing-tips, is easily distinguished in the field and cannot be mistaken for any other species. However, this goes only for the males; the opposite sex is discerned from its congeners with more difficulty. A medium-length humeral stripe, a rhinarium with few yellow spots and middle segments of the abdomen each with a narrow elongated spot that covers the entire length of the segment are useful determination characters in females.

L. greeni is restricted to the southern half of Sri Lanka though there is an old unconfirmed museum record from “Candelay” in the north east. It is found



on streams as well as on large and small rivers and does not seem to mind fast-flowing water. Males are usually seen sitting low on a rock or trunk in close proximity to water ripples. Often, they engage between themselves in showy aerial contests, confronting white tibiae while hovering towards each other. Females are less frequently seen though they do perch on rocks or overhanging branches at the edge of the stream or river and are often seen laying eggs into the same chunk of timber at the water surface.

Given the fact that, considering the number of known localities, *L. greeni* is the commonest representative of the genus in Sri Lanka, it is clear that it is not endangered on the global level. Based on a less extensive dataset, it has been listed by VAN DER POORTEN & CONNIFF (2012) as Endangered in the National Red List.



Number of all localities: **109** after 1990: **82**

Number of all records: **130** after 1990: **94**

Extent of Occurrence (EOO): **22,522 km²**

Area of Occupancy (AOO): **368 km²**

% of records per period:

1850-1920 1921-1990 1991-2013

7 21 72

IUCN Red List Criteria: **NOT APPLICABLE**

IUCN Red List Category: **LEAST CONCERN**

References & Synonymy:

Micromerus greeni, Laidlaw, 1924, *Spolia Zeylanica* 12: 352-354, fig 5.

Micromerus greeni - LAIDLAW (1924): 352-354, fig. 5; *Libellago greeni* - FRASER (1928): 689, 690, pl. I, fig. 1; FRASER (1934): 59, 68-70, fig. 21a; FRASER (1939): 24; LIEFTINCK (1940): 83; LIEFTINCK (1955): 68; FERNANDO (1964): 190; LIEFTINCK (1971a): 189, 206; COSTA & STARMÜHLNER (1972): 52, 53, 63, 64; DAVIES & TOBIN (1984): 17; STARMÜHLNER (1984): 224, 230; TSUDA (1986): 66, 218; FERNANDO (1990): 186; TOL (1992): 115; BEDJANIĆ (1998): 9, 15, 20, 58, 63, 67, 75, 79 – app. 5.1.D; DE FONSEKA (2000): 11, 37-39, 41-42, 203, 223, 283, figs. B11a-c, pl. 2; IUCN SRI LANKA (2000): 24; BEDJANIĆ (2002): 6, 8; DE SILVA WIJEYERATNE et al. (2003): pl. 1; BEDJANIĆ (2004): 283; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2006): pl. 2; BEDJANIĆ et al. (2007): 15, 38-39; HÄMÄLÄINEN ET AL. (2010): 3-4; VAN DER POORTEN (2011a): 18-19; VAN DER POORTEN (2012b): 52; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 5;





EUPHAEIDAE

Gossamerwings

Euphaea splendens Hagen, 1853

Shining Gossamerwing

ENDEMIC

If among the many beautiful Sri Lankan endemic dragonflies the finest has to be selected, *Euphaea splendens* would definitely deserve such status.

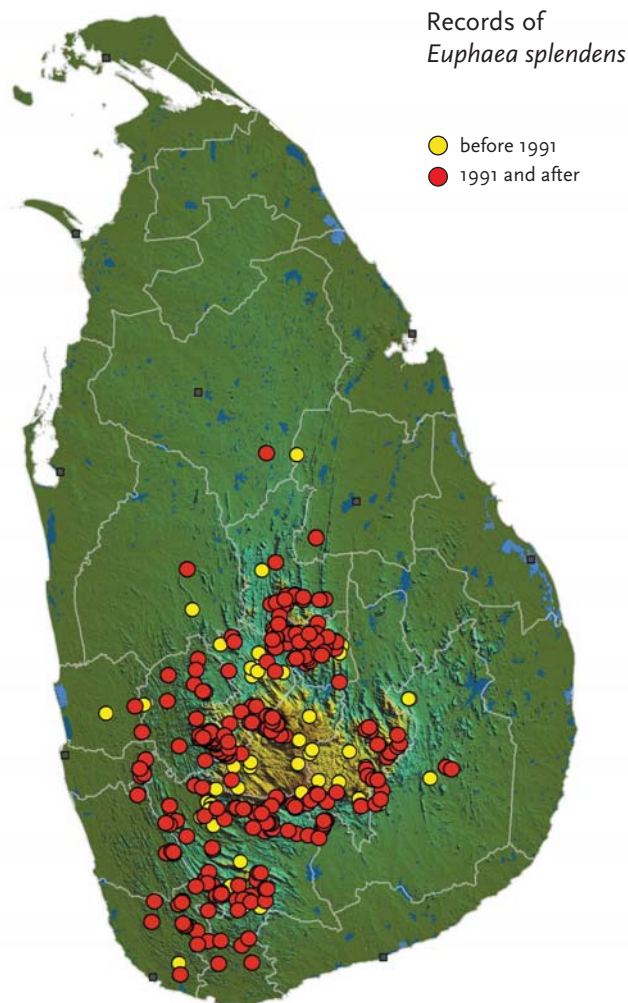
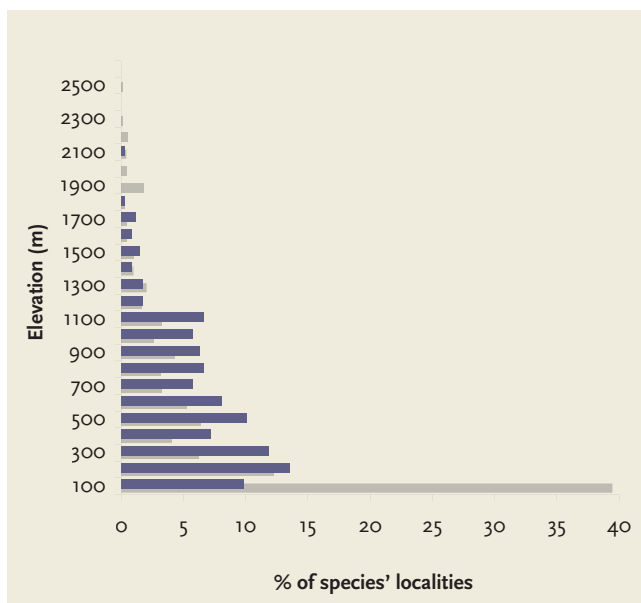
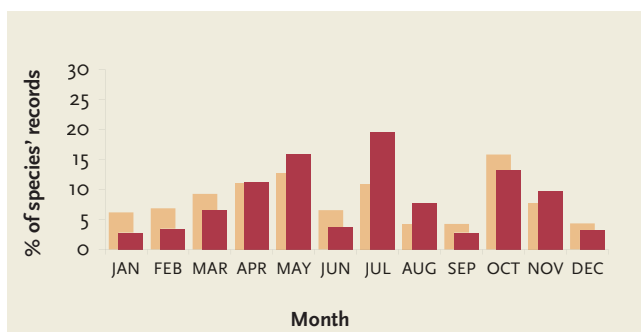
Despite negative human impact on flowing waters it still remains a small adornment of numerous streams and rivulets in the hilly central and southwestern parts of the island, as confirmed by the present work. It won the prestigious title of the commonest dragonfly of Sri Lanka—it has been recorded from more than 350 localities! It is also worth stressing that *E. splendens* was the first dragonfly described from Sri Lanka as far back as 1853 (HAGEN in SELYS, 1853). And when it comes to its beauty, it is hard to add anything to the impressions of TENNENT (1858) who poetically wrote that when it “...dances above the mountain streams,... gleams in the sun as if each of its green enamelled wings had been sliced from an emerald.” Also FRASER (1929a, 1934) described it as “... one of the most beautiful dragonflies found in Asia.”

As almost a rule of beauty in dragonflies, showy colours on the wings and contrasting elegant velvety black body belong to the males. They are easily spotted resting on stones and rocks in the middle of fast flowing streams and rivulets or elegantly flitting under waterfalls and splashing cascades. Females are far more somberly coloured and have transparent, more or less enfumed wings. They are surprisingly seldom seen at the streams and mating observations are extremely rare. The same goes for oviposition, which takes place below the water level. On one occasion, the female was observed, crashing with considerable speed directly into the water to break the surface tension of the fast flowing rivulet and in her second attempt managed to



submerge and oviposit into a dead twig. On another occasion, the female was found already ovipositing underwater at the side of a stream and continued to slowly lay her eggs into the stem of a live water plant for more than 20 minutes. Of course, the underwater stream world is the primary habitat of *E. splendens* larvae. They live under stones, have inflated caudal lamellae and lateral abdominal gills, which is a unique feature of Euphaeidae.

Without data from the past to compare it is impossible to estimate the population trend of this endemic species, however, it is safe to conclude that currently it is not endangered. Still, surprisingly little is known about the biology and ecology of *E. splendens*. Also its phylogenetic relationships are not clearly understood, since according to LIEFTINCK (1971a) it is not closely related to the Indian species of the family but has its nearest allies in Indonesia and the Philippines. In many aspects it would be an ideal and rewarding object for future studies by Sri Lankan natural history students.



| | |
|-------------------------------|-----------------|
| Number of all localities: 356 | after 1990: 272 |
| Number of all records: 504 | after 1990: 352 |

| |
|--|
| Extent of Occurrence (EOO): 19,960 km ² |
| Area of Occupancy (AOO): 1,040 km ² |

% of records per period:

1850-1920 1921-1990 1991-2013

| | | |
|---|----|----|
| 4 | 26 | 70 |
|---|----|----|

IUCN Red List Criteria: NOT APPLICABLE

IUCN Red List Category: LEAST CONCERN

References & Synonymy:

Euphaea splendens, Hagen in Selys, 1853, Bull Acad. r. Belg. 20 (Annexe): 52.

Euphaea splendens - SELYS (1853): 52; SELYS (1854): 178; HAGEN (1858): 478; TENNENT (1859): 252, 281; TENNENT (1861): 411, 454; BRAUER (1865b): 1009, 1014-1015; SELYS (1873a): 485; BAKER (1937): 547; LAIDLAW (1951): 81; LIEFTINCK (1955): 69; FERNANDO (1964): 190; LIEFTINCK (1971a): 189, 206; COSTA & STARMÜHLNER (1972): 48, 51, 52, 53, 54, 56, 57, 61, 62, 63, 67, 72, 73; St. QUENTIN (1973): 113-115, 123, figs. 1-4; DAVIES & TOBIN (1984): 24; STARMÜHLNER (1984): 222, 230; TSUDA (1986): 73, 219; FERNANDO (1990): 186; TOL (1992): 212; BEDJANIĆ (1998): 8, 15, 20, 58, 63-64, 75, 79 – app. 5.1.C; ALLEN (2000): 25; DE FONSEKA (2000): 11, 35-37, 202, 222, 260, 283, figs. B5, C1, pl. 2; IUCN SRI LANKA (2000): 24; BEDJANIĆ (2002): 5-6, 8; DE SILVA WIJAYERATNE et al. (2003): pl. 1; BEDJANIĆ et al. (2006): pl. 2; BEDJANIĆ et al. (2007): 15, 42-43; WCSG (2008): 15; WCSG (2009): 14; CHANDANA et al. (2012): 69, 70; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 5; *Euphaea* (sic!) *splendens*: MOTSCHULSKY (1863): 8; *Euphaea* sp. - BRAUER (1864): 160; *Pseudophaea splendens* - KIRBY (1890): 18, 110; KIRBY (1891): 204; KIRBY (1894): 545, 559; LAIDLAW (1917a): 32; LAIDLAW (1924): 356-357; FRASER (1929a): 291, 292; FRASER (1934): 99, 100-102; PRASAD & VARSHNEY (1995): 414; *Pseudophaea carissima* - KIRBY (1894): 559-560, pl. XLII-fig. 4; *Pseudophaea carissima* var. *viridissima* - KIRBY (1894): 560; *Euphaerea* (sic!) *splendens* - STARMÜHLNER (1984): 224; *Euphaea* (sic!) *splendens* – DE SILVA WIJAYERATNE (2001): 20;





LESTIDAE

Spreadwings





Lestes elatus Hagen, 1862

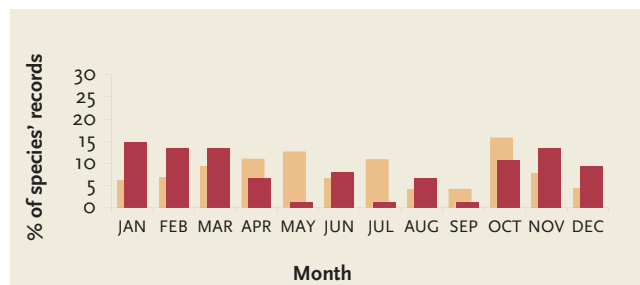
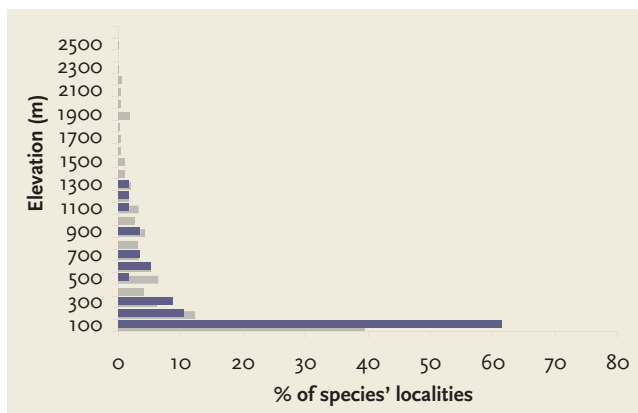
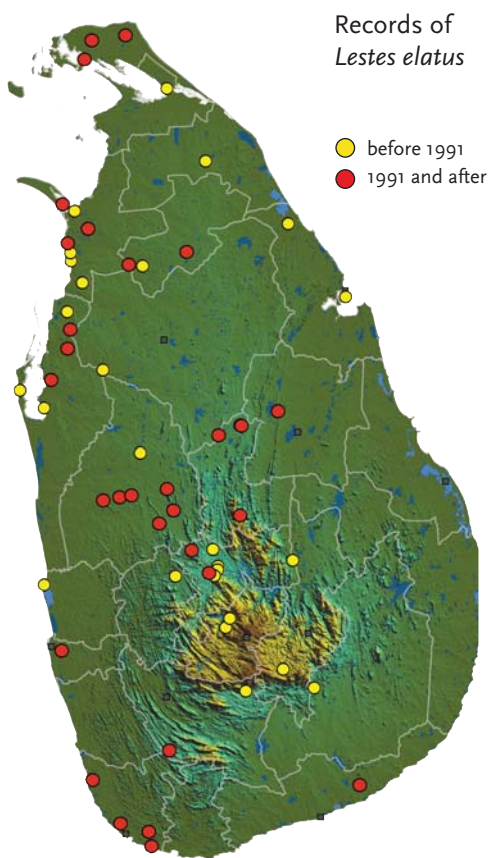
White-tipped Spreadwing

As suggested by their English generic name, the Spreadwings are instantly recognized in the field by their habit of resting with spread wings, which is not the case with most damselflies.

Of the three congeners found in Sri Lanka, *Lestes elatus* is most reliably identified by the hook-shaped mark on the dorsum of the thorax in both sexes that can usually be discerned, and also by the heavily whitish pruinose older males. Also, the shape, length and colour of the male's anal appendages are characteristic—they are creamy-yellow tipped with black in teners and young males, and fully black with the apices tipped with yellow hairs in mature adults.

Lestes elatus is fairly common in the lowlands and mid-elevations and has been reported from all over the island including Jaffna in the north and Galle and Hambantota in the south. There are only a few old records from the eastern coast but that may be due to lack of serious surveys in the last few decades. There are also old records from the central hills, including the species' type locality at Rambodde (HAGEN *in* SELYS, 1862), that have not been confirmed in recent years.

The species breeds in ponds and tanks and also occurs in India and Thailand. Though easy to identify if seen close up, *Lestes elatus* is often found perching in places where it is difficult to see clearly—among the grasses at the edge of a tank.



Number of all localities: 57

after 1990: 31

Number of all records: 85

after 1990: 51

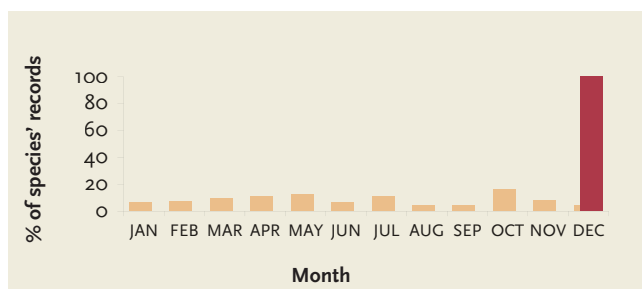
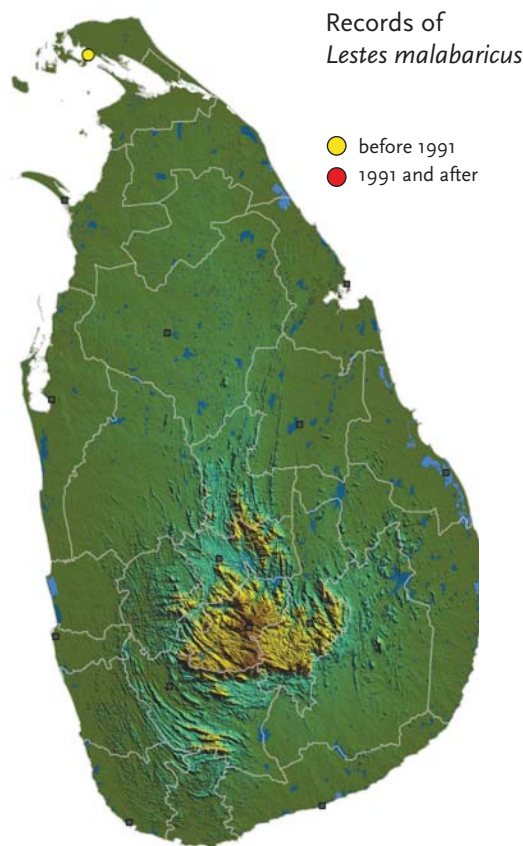
Lestes malabaricus Fraser, 1929

Malabar Spreadwing

Among the least known damselfly species in Sri Lanka, *Lestes malabaricus* has a special place, being known from only one very old record. Luckily there is a specimen associated with it to prove the identification—a single male was collected in Jaffna in December 1932 and determined by F. C. Fraser (DE FONSEKA, 2000, VAN DER POORTEN, 2011C). It is housed in the collection of the Entomology Department of the Sri Lanka National Museum, and recently, Nancy van der Poorten and Karen Conniff were able to inspect the specimen and confirm its identity.

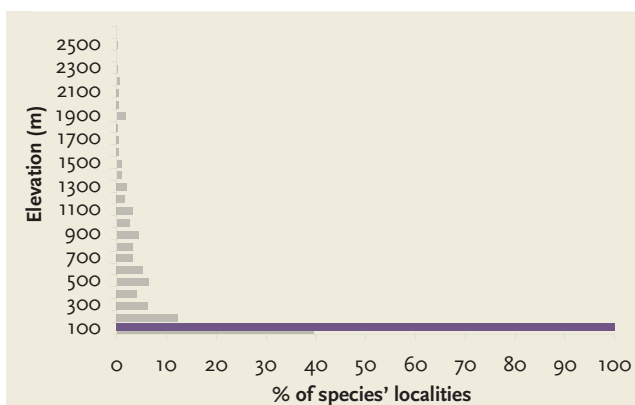
L. malabaricus is somewhat similar to *L. elatus* except that it has two thick black bands enclosing a medial narrow brown stripe on the side of the thorax and differently shaped anal appendages in the male. For South India FRASER (1933a) reported that in suitable tanks and ponds in South Malabar and Cochin “the species breeds in great abundance and almost completely crowds out *L. elatus* and *L. praemorsus decipiens*.”

In the northern lowland parts of Sri Lanka, suitable habitats for the species exist but it is not known if the insect is resident or was perhaps blown over with monsoon winds from India. It is possible and hoped that more intensive research in the north of the island will bring additional observations of the species in forthcoming years.



Number of all localities: 1 after 1990: 0

Number of all records: 1 after 1990: 0





Lestes praemorsus decipiens Kirby, 1894

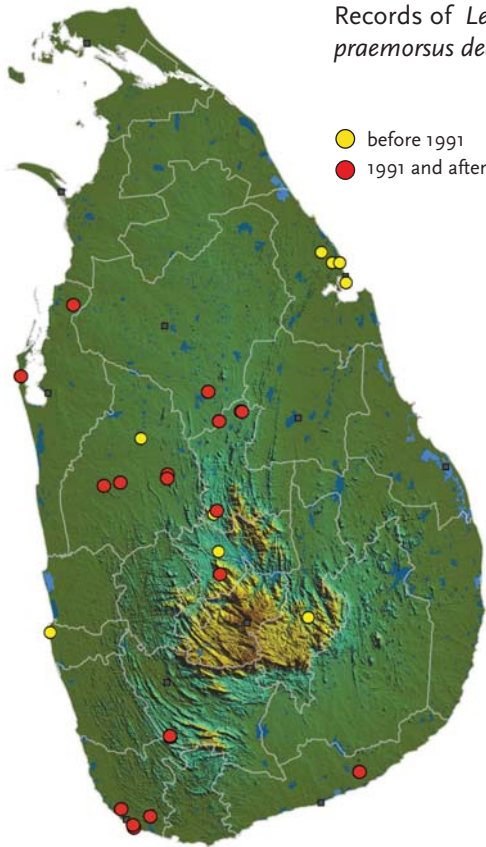
Scalloped Spreadwing

Of the Spreadwings found in Sri Lanka, *Lestes praemorsus decipiens* has the widest global distribution, ranging from India to China, Taiwan, Borneo and Sumba Island in Indonesia. It can be easily identified by the three-pronged scalloped pattern on the dorsum of the thorax of both sexes. Males are bluish and become quite dark and pruinose as they age; females are more brownish. It should be noted that this widely distributed western subspecies was first described by KIRBY (1894) as *L. decipiens*, based on material from Sri Lanka.

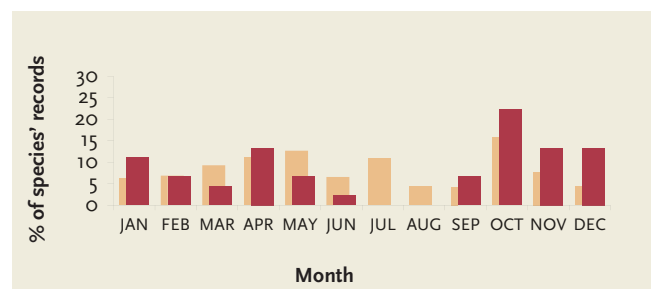
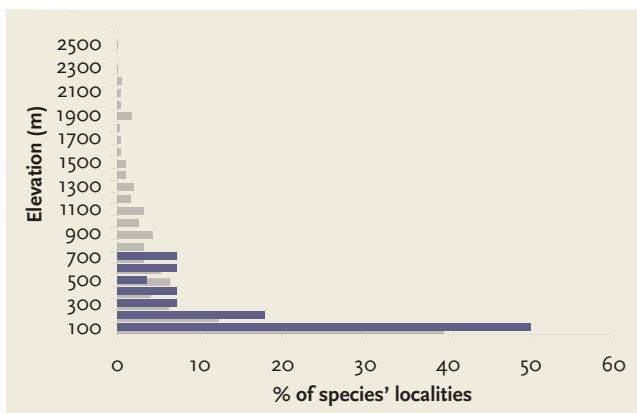
L. praemorsus decipiens appears to be less common than *Lestes elatus* though its localities are scattered in different regions of the island, predominantly in the lowlands but also up to the mid-hills. There are no records from the southeast coast or the north though there are records, well over a century old, from the vicinity of Trincomalee (KIRBY, 1894).

As with *Lestes elatus*, these damselflies often perch a metre or two from the shore among tall grasses at the edge of a tank. Females lay eggs into plant material floating on the surface of the water escorted in tandem by the male.

Records of *Lestes praemorsus decipiens*



- before 1991
- 1991 and after



Number of all localities: **28** after 1990: **19**

Number of all records: **49** after 1990: **39**

Sinhalestes orientalis (Hagen, 1862)

Emerald Sri Lankan Spreadwing

ENDEMIC

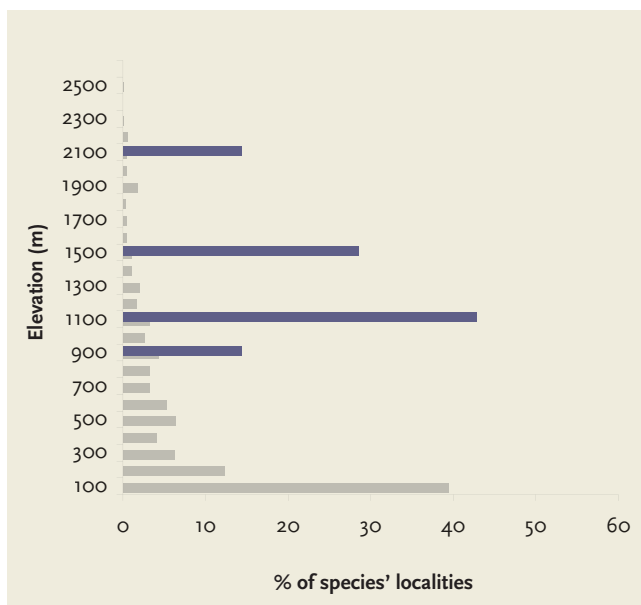
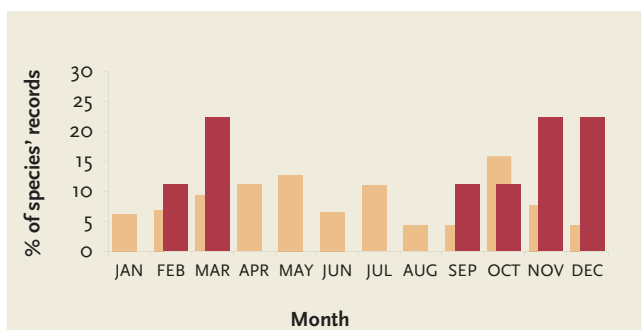
The enigmatic *Sinhalestes orientalis* is a Sri Lankan endemic at both the genus and species level and the only known representative of its genus in the world. It was first reported from the island in 1859 by H. A. Hagen who published only the name *Lestes orientalis* and indicated that the sole female had been collected by plantation owner and renowned collector J. Nietner at “Rambodde” (HAGEN, 1859). An official description of both sexes, obviously based on additional material, was published in 1862 by Hagen in *Synopsis des Agrionines*, the work of the famous odonatologist E. de Selys-Longchamps (HAGEN *in* SELYS, 1862). Since then, for more than 150 years, nothing else has been known about the species, with no subsequent records or any other information.

After unsuccessful targeted searches in the last decade, the species was finally rediscovered in September and October 2012 near Thummodara in the Peak Wilderness Sanctuary by a young Sri Lankan biologist, Amila Sumanapala. In this area, *S. orientalis* has been found at three mountain forest streams, additionally also in February and March 2013 (SUMANAPALA & BEDJANIČ, 2013). Matjaž Bedjanič and Karen Conniff made more sightings near the pass on the Hatton-Balangoda road in the eastern part of the Peak Wilderness Sanctuary in November and December 2012. Surprisingly, in December 2012 the species was recorded by Ian



Lockwood at the very summit of Sri Lanka’s holy mountain Adam’s Peak whereto it must have flown from the surrounding forests, possibly attracted by lights. The last new record, contributed by Nirodha Abayalath, comes from the eastern slopes of Adam’s Peak, where a mating pair of *S. orientalis* was observed in a small rivulet near the Fishing Hut at the end of March 2013.

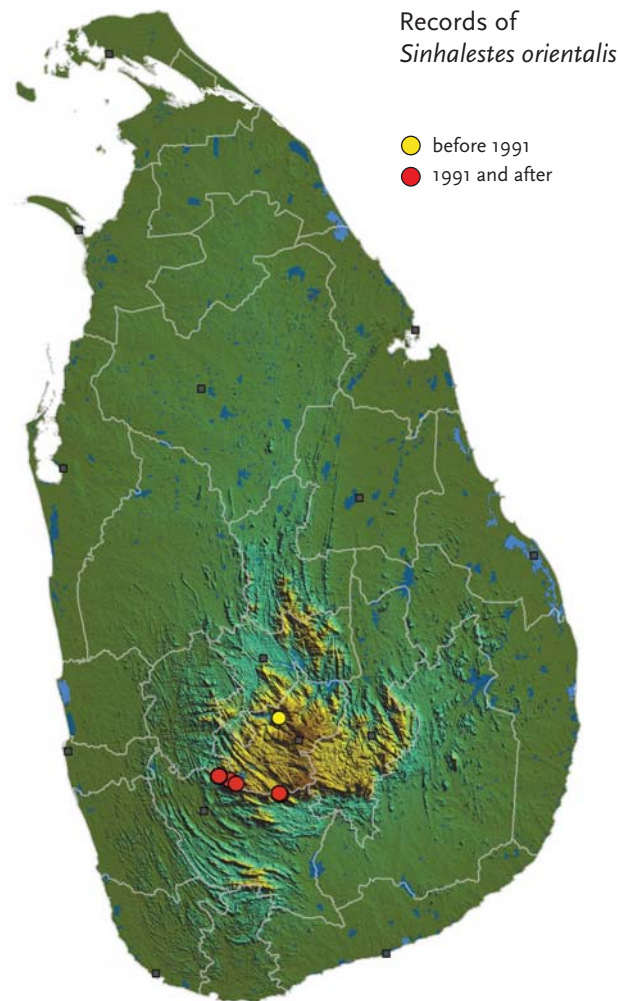
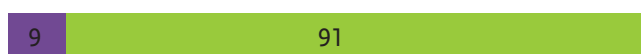
It is amazing how much new knowledge on the habitat and phenology of *S. orientalis* has been accumulated in just the few last months. Ongoing research by Amila Sumanapala and his colleagues, will help to further broaden the picture. However, due to the extensive degradation of natural habitats in the Central Highlands of Sri Lanka, the long term future prospects for the survival of this species are not bright. Its Red List status as Critically Endangered both nationally (VAN DER POORTEN & CONNIFF, 2012) and globally (BEDJANIČ, 2006a; 2009b) thus remains unchanged.



| | |
|-----------------------------|----------------|
| Number of all localities: 8 | after 1990: 7 |
| Number of all records: 11 | after 1990: 10 |

% of records per period:

1850-1920 1921-1990 1991-2013



| | |
|-----------------------------|---------------------|
| Extent of Occurrence (EOO): | 460 km ² |
| Area of Occupancy (AOO): | 24 km ² |

IUCN Red List Criteria: CR B1ab(iii)+2ab(iii)

IUCN Red List Category: CRITICALLY ENDANGERED

References & Synonymy:

Lestes orientalis, Hagen in Selys, 1862, Bull. Acad. r. Belg. 2(13): 322-323.

Lestes orientalis - HAGEN (1859): 206; SELYS (1862): 322-323; KIRBY (1890): 163; KIRBY (1894): 546, 566; LAIDLAW (1920): 155; LAIDLAW (1924): 357; FRASER (1930): 87; FRASER (1933a): 30, 48-49; LIEFTINCK (1955): 69; FERNANDO (1964): 190; TSUDA (1986): 55, 218; FERNANDO (1990): 186; *Lestes* (?) *orientalis* - LAIDLAW (1951): 81; *Lestes* (*Sinhalestes*) *orientalis* - LIEFTINCK (1971a): 206; *Sinhalestes orientalis* - DAVIES & TOBIN (1984): 35; TSUDA (1986): 57, 218; TOL (1992): 170; MOORE (1997): 16, tab. 6.2; BEDJANIĆ (1998): 9-10, 21, 58, 63-64, 67-68, 71, 73, 75; DE FONSEKA (2000): 11, 46-47; IUCN SRI LANKA (2000): 25; BEDJANIĆ (2001): 10; BEDJANIĆ (2002): 18; BEDJANIĆ (2004): 281-283, 285-286, 289; BEDJANIĆ (2006a): www.iucnredlist.org; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 22-25; BEDJANIĆ et al. (2007): 15; IUCN SRI LANKA & MOENR (2007): 46; BEDJANIĆ (2009b): www.iucnredlist.org; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 1, 4, 5; SUMANAPALA & BEDJANIĆ (2013): 44-47, figs.1-3.

Faunistic records: APPENDIX 2, page 292;

Indolestes divisus (Hagen, 1862)

Closed-wing Reedling

ENDEMIC

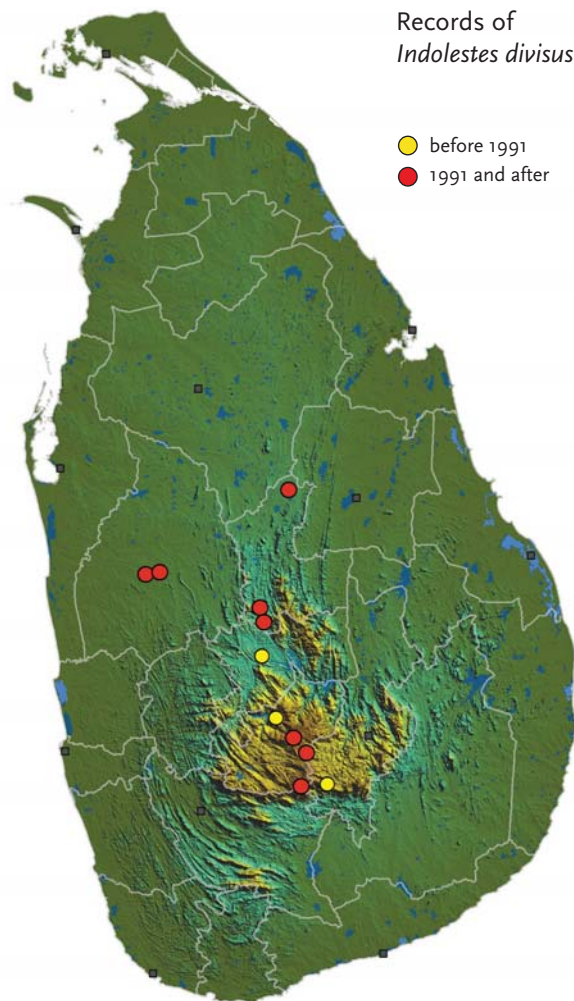
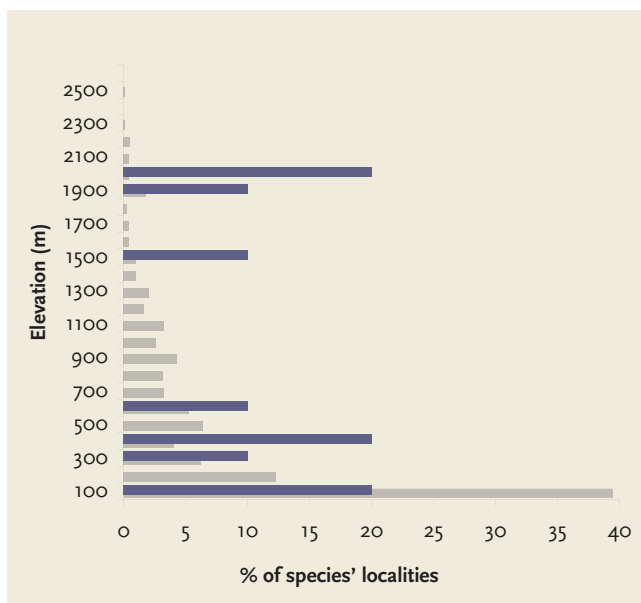
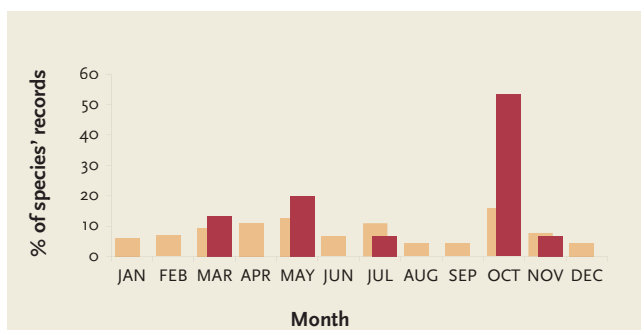
Another very poorly known endemic member of the family Lestidae is *Indolestes divisus*. This slender inconspicuous species is apparently quite rare and difficult to spot. It is not easily separated from the closely related *Indolestes g. gracilis* without closer inspection. They both belong to the subfamily Sympecmatinae, have a bluish ground colour and keep their wings closed together during rest, thereby not literally deserving its English family name. As for all three endemic Spreadwings, the description of both sexes was provided in 1862 by H. A. Hagen, based on material from “Rambodde” (HAGEN *in* SELYS, 1862). Additional taxonomic notes followed, by LAIDLAW (1924) and FRASER (1933a), who noted that *I. divisus* differs from *I. gracilis* in the following ways: the dark metallic-green dorsal mark on the second abdominal segment touches both ends of the segment, the dark basal mark on the ninth segment is shaped as a backwardly directed point, the anal appendages of the males have a shorter apex, are shorter, rounded and not lancet shaped and the pterostigma is shorter.

As far as the species' habitat is concerned it has been found at grassy edges of paddy fields, as well as in small reed- and grass-lined ponds. It is interesting that one set of localities is situated in the mountains where beside its type locality, *I. divisus* is known from Horton Plains National Park, Hakgala and Nuwara



Eliya (LIEFTINCK, 1971; DE SILVA WIJEYERATNE, 2012). The other set of more northern localities starts with Kandy (LAIDLAW, 1924) and continues to the lowlands where Karen Conniff recorded it at Matale and Wariyapola and Nancy van der Poorten recorded it at Bandarakoswatte near Wariyapola.

The seasonal phenology, biology and behaviour of *I. divisus* are only fragmentarily known and a special study should be devoted to the species in the near future. It is very likely that at least in the lowlands of Sri Lanka intensive rice production with its use of insecticides and pesticides negatively impacts its populations. Apart from its obvious general scarcity and also taking into account the limited area of occupancy of this endemic Reedling, the view of VAN DER POORTEN & CONNIFF (2012) who listed it as Endangered is followed also on the global level. Herewith, *I. divisus* is ranked as a globally threatened Endangered species according to IUCN Red List Criteria.



| | |
|------------------------------|---------------|
| Number of all localities: 12 | after 1990: 8 |
| Number of all records: 15 | after 1990: 9 |

| |
|---|
| Extent of Occurrence (EOO): 4,846 km ² |
| Area of Occupancy (AOO): 40 km ² |

% of records per period:



IUCN Red List Criteria: EN B1ab(iii)+2ab(iii)

IUCN Red List Category: ENDANGERED

References & Synonymy:

Lestes divisa, Hagen in Selys, 1862, Bull. Acad. r. Belg. 2(13): 328.

Lestes divisa - SELYS (1862): 326, 328; LAIDLAW (1920): 158; LAIDLAW (1924): 358-360, figs. 8a-b; LIEFTINCK (1955): 69; FERNANDO (1964): 190; FERNANDO (1990): 186; *Lestes divisus* - KIRBY (1890): 163; SELYS (1891): 495 (*pars*); RIS (1916): 13; KIRBY (1894): 566; *Ceylonolestes divisa* - FRASER (1930): 95, 96; FRASER (1933a): 63, 65-67, fig. 29; *Lestes (Ceylonolestes) divisa* - LAIDLAW (1951): 81; *Lestes (Indolestes) divisa* - LIEFTINCK (1971a): 190, 206; *Indolestes divisus* - DAVIES & TOBIN (1984): 37; TSUDA (1986): 53, 217; TOL (1992): 85; DE FONSEKA (2000): 7, 30, 165, 199, fig. B17 a-c; IUCN SRI LANKA (2000): 25; BEDJANIĆ (2004): 283, 286; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2007): 15; VAN DER POORTEN (2012c) in PETHIYAGODA (2012): 183; DE SILVA WIJEYERATNE (2012b) in PETHIYAGODA (2012): 186, 188; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 5; *Indolestes divisa* - BEDJANIĆ (1998): 9, 22, 58, 63-64, 67, 75;

Faunistic records: APPENDIX 2, page 292;

Indolestes gracilis gracilis (Hagen, 1862)

Mountain Reedling

ENDEMIC

When visiting the wetlands around Nuwara Eliya, Horton Plains National Park or Hakgala Botanic Gardens from March to June or August to October, it is quite easy to see the beautifully blue and bronzy-black males and brownish coloured females of the endemic *Indolestes gracilis gracilis*. At grassy edges of small lakes and ponds it is possible to easily observe them profusely mating and laying eggs, with multiple pairs lining up along a single grass stem at the water's edge.

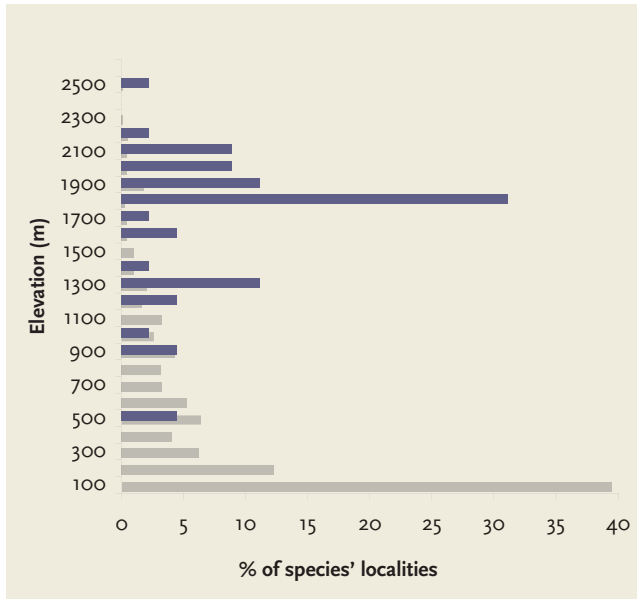
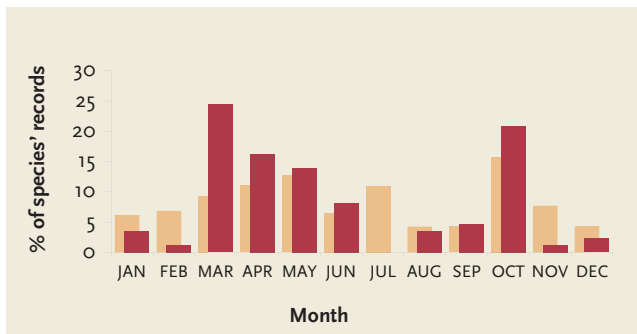
The distribution of *I. g. gracilis* is limited to the Central Highlands of Sri Lanka with most of its localities lying above 1,800 metres altitude and with the highest record lying close to the sky at over 2,500 metres. The only exceptions falling out of this general scheme are somewhat doubtful old southern records from Deniyaya, where it was recorded in 1975 and 1976 in the course of the Smithsonian Insect Project in Sri Lanka and never since.

The species was among the first recorded from Sri Lanka as early as 1858 (HAGEN, 1858) and officially described four years later (HAGEN *in* SELYS, 1862). Thoracic markings in adult insects are quite variable (LIEFTINCK, 1940) in both sexes and not very useful in distinguishing it from *I. divisus*, discussed in previous pages. Since the times of RIS (1916), polytypic *I. gracilis* has been split into different subspecies, with the nominotypical one considered



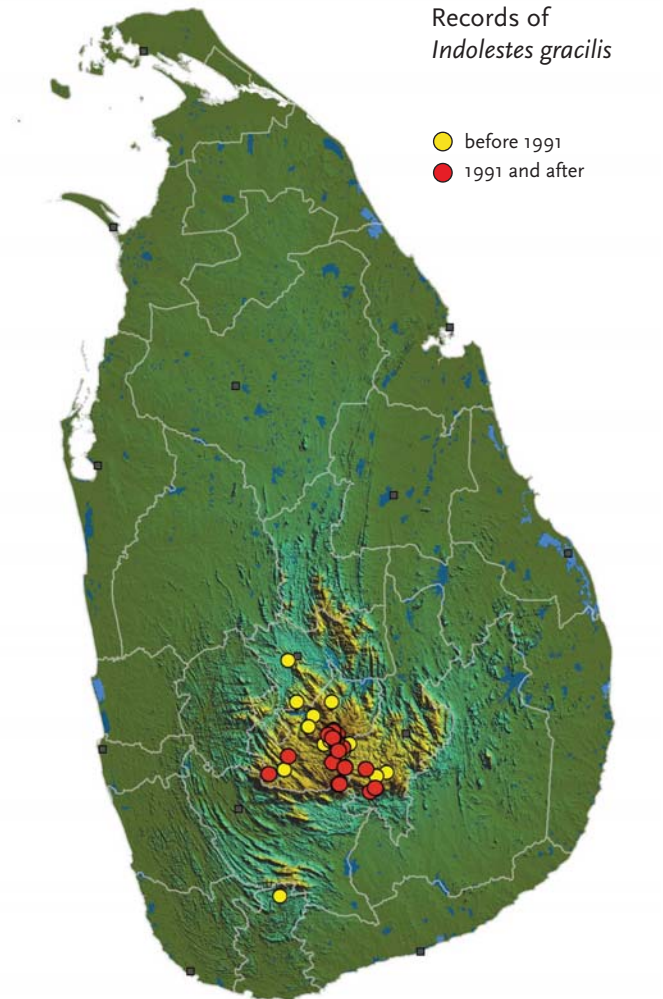
to be restricted to Sri Lanka. There is a need to revise material from southern India in order to establish the status of these mainland populations. However, in this book the view of RIS (1916), LAIDLAW (1924), FRASER (1933a) and LIEFTINCK (1955, 1971) is followed and *I. g. gracilis* is treated as an endemic Sri Lankan subspecies.

Some populations of *I. g. gracilis* in the central mountainous part of Sri Lanka are still strong and stable, however, considering the fieldwork effort in the last years, the ratio of new records after 1990 is far below the one achieved in several other species. Although without solid proof, this could mean a possible decline of populations in the last few decades. Due to very strong agricultural use pressure on lakes, pools and swamps in this region and due to a quite limited extent and area of occurrence, it is suggested to list *I. g. gracilis* among globally threatened dragonfly taxa in the Vulnerable IUCN Red List Category.



| | |
|------------------------------|----------------|
| Number of all localities: 47 | after 1990: 24 |
| Number of all records: 86 | after 1990: 46 |

% of records per period:



Extent of Occurrence (EOO): 2,718 km²

Area of Occupancy (AOO): 124 km²

IUCN Red List Criteria: VU B1ab(iii)+2ab(ii,iii,iv)

IUCN Red List Category: VULNERABLE

References & Synonymy:

Lestes gracilis, Hagen in Selys, 1862, Bull. Acad. r. Belg. 2(13): 327-328.

Lestes gracilis - HAGEN (1858): 478; TENNENT (1859): 282; TENNENT (1861): 454; SELYS (1862): 326-328; MOTSCHULSKY (1863): 8; KIRBY (1890): 163; KIRBY (1894): 545, 566; LAIDLAW (1920): 158; *Lestes gracilis* ? - KIRBY (1891): 206; *Lestes gracilis gracilis* - RIS (1916): 12-15; LAIDLAW (1924): 358; figs. 7a-b; LIEFTINCK (1940): 88; LIEFTINCK (1955): 69; FERNANDO (1964): 190; FERNANDO (1990): 186; *Ceylonolestes gracilis* - FRASER (1930): 94, 95, pl. I, fig. 8; FRASER (1933a): 63, 64-65, fig. 28; *Lestes (Ceylonolestes) gracilis* - LAIDLAW (1951): 81; *Lestes (Indolestes) gracilis gracilis* - LIEFTINCK (1971a): 190, 206; *Indolestes gracilis gracilis* - TSUDA (1986): 53, 217; TOL (1992): 114; BRIDGES (1994): VII.100; BEDJANIĆ (1998): 9, 15, 22, 58, 63-64, 67, 75; DE FONSEKA (2000): 11, 52-53, 203, 283, figs. B18a-c; BEDJANIĆ (2002): 5, 8; DE SILVA WIJEYERATNE et al. (2003): pl. 1; BEDJANIĆ (2004): 283; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2007): 15, 50-51; DOW (2010): www.iucnredlist.org; DE SILVA WIJEYERATNE (2012) in PETHIYAGODA (2012): 188; *Indolestes gracilis* - LIEFTINCK (1960b): 140; IUCN SRI LANKA (2000): 25; BEDJANIĆ et al. (2006): pl. 3; VAN DER POORTEN (2012c) in PETHIYAGODA (2012): 183-184; DE SILVA WIJEYERATNE (2012b) in PETHIYAGODA (2012): 186; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 5;

Faunistic records: APPENDIX 2, page 292-293;





COENAGRIONIDAE

Bluets







Onychargia atrocyana Selys, 1865

Marsh Dancer

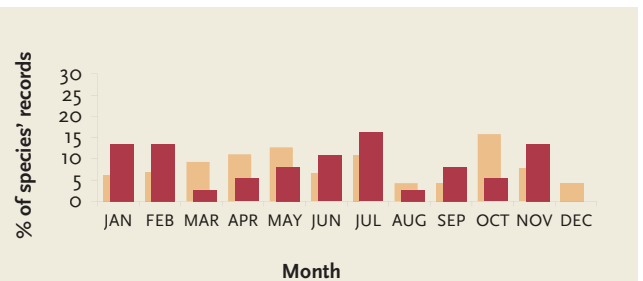
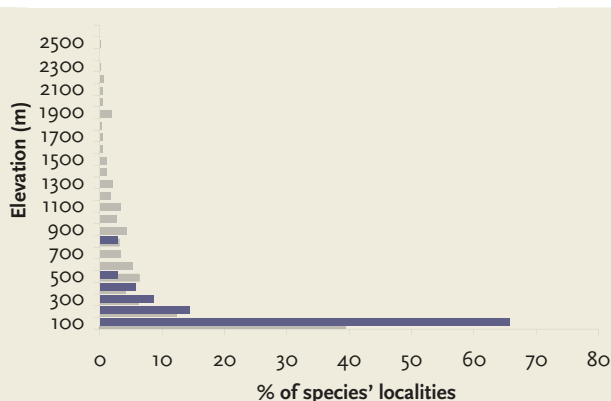
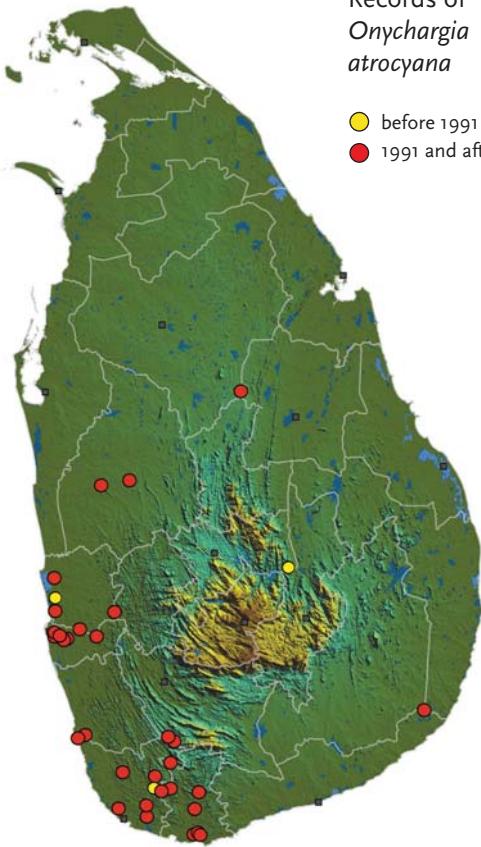
An iridescent dark colouration, quite foreign to other members of the family, stout build, hairy face, peculiar wing venation and gradual expansion of the last three segments of the abdomen are some of the distinctive characters of *Onychargia atrocyana*. In males, the thorax has a gentle purplish reflex and yellow lateral stripes that fade and darken as the insect ages. The female and young males appear very similar, with shiny black grounding and yellowish to whitish markings on the face, occiput, thorax and abdomen.

It is amazing how much new data on the distribution of *O. atrocyana* in Sri Lanka has been gathered in the last two decades in comparison with only three known localities reported in the older literature (KIRBY, 1894; LIEFTINCK, 1971a). New records mostly come from the Wet zone though there are scattered records from the drier lowland parts of the island as well. The species appears to be quite common in marshes around Colombo; it has been found, for example, in the Kotte swamps and around Talangama tank.

O. atrocyana prefers weedy habitats near rice fields, marshes and tanks. Since it is often found resting in a tree above eye level it might be overlooked. Though FRASER (1933) reported it from the “...hilly tracts of Ceylon”, this does not appear to be the case. Otherwise, *O. atrocyana* has a wide distribution and occurs throughout Southeast Asia.

Records of
Onychargia
atrocyana

- before 1991
- 1991 and after



Number of all localities: 35

after 1990: 32

Number of all records: 48

after 1990: 45

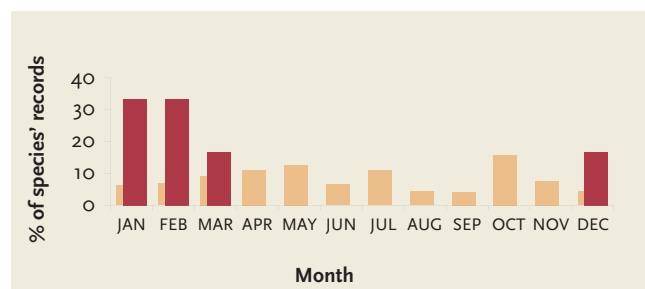
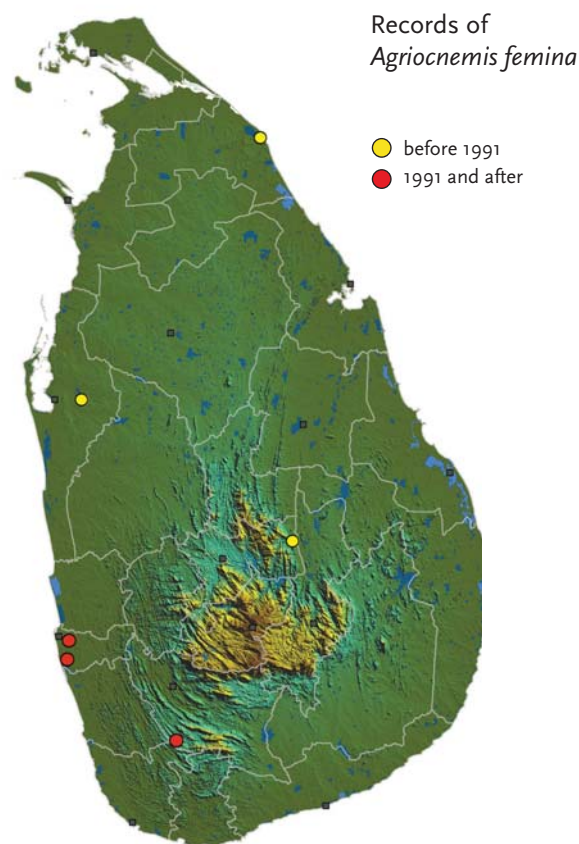
Agriocnemis femina (Brauer, 1868)

White-backed Wisp

Out of the two tiny Wisps found in the island, *Agriocnemis femina* is the least known and very scarce. Whitish pruinescence that covers the mature male's thorax and clearly longer inferior than superior anal appendages are helpful in discriminating it from the quite similar *A. pygmaea*.

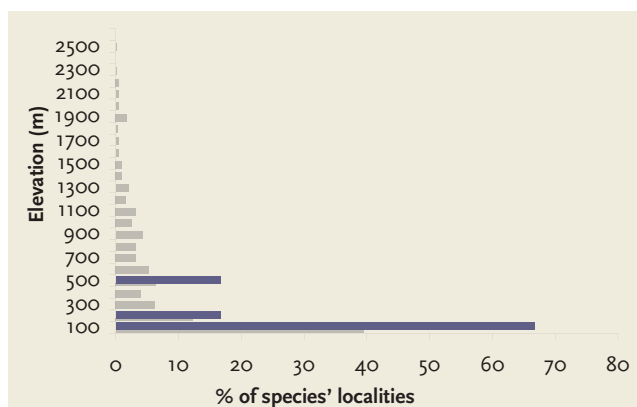
Its distribution is wide and reaches from India in the west to Papua New Guinea and Australia in the east, but in Sri Lanka only a handful of localities are currently known. Apart from records by RIS (1916), LIEFTINCK (1971a) and BEDJANIĆ (2002), there is an old Smithsonian record from Hasalaka and recently it has been found in the Kotte Swamp and in Attidiya.

Although small in size and apparently quite rare in Sri Lanka, *A. femina* still remains a big unsolved taxonomic enigma. In its wide geographic range the species, as considered presently, breaks up in a number of structurally fairly well-defined taxa which unfortunately have not been sufficiently studied yet. As already stated by RIS (1916) and BEDJANIĆ (2002), populations from Sri Lanka appear to be a distinct taxon from the nominotypical *A. femina*, but further research in this respect is badly needed.



Number of all localities: 6 after 1990: 3

Number of all records: 6 after 1990: 3





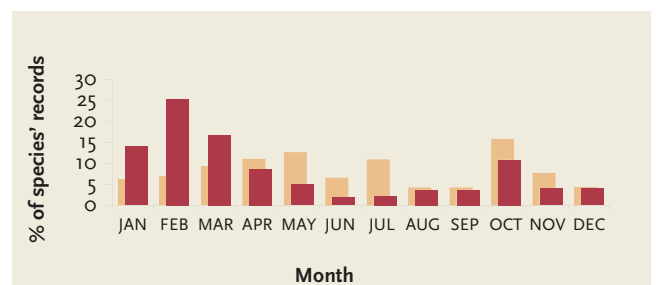
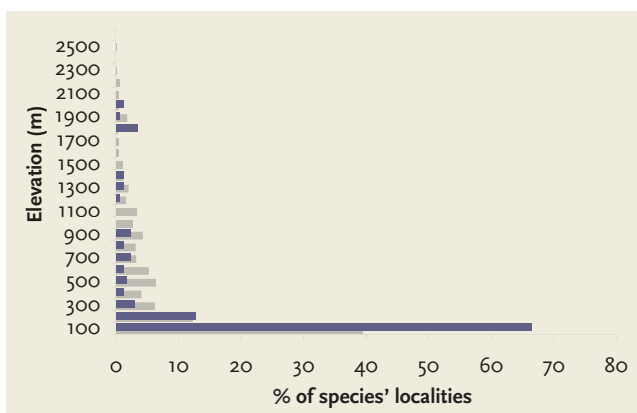
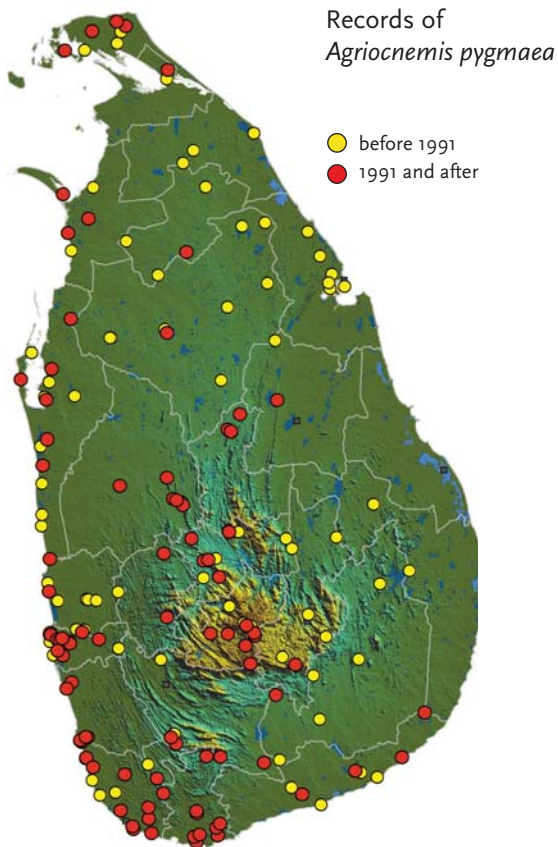
Agriocnemis pygmaea (Rambur, 1842)

Wandering Wisp

Despite being easily overlooked due to its minute size and quite inconspicuous appearance, *Agriocnemis pygmaea* has been recorded at many localities all over the island and is among the commonest damselflies of Sri Lanka. It is usually found clinging to grasses along the edges of small lakes and ponds, paddy fields, grassy lawns, ditches, canals and even beach areas. The species is by far commonest in the plains, however, it can be met throughout the year at all elevations, even up to 2,000 metres.

Although usually not pruinosed, being black on the dorsum and apple green on the sides, in some cases the thorax and head of older males turn powdery whitish, strongly resembling *A. femina*. In such cases a look at the slightly longer superior than inferior anal appendages will securely separate the former from the latter. Females have several colour forms. The isochrome females are similar in colouration to the male. The red form of the female with its pinkish-red abdomen and thorax is easier to spot. A third female form is of the same colour as the juvenile male, having less black on the body than the full adult.

Small size is certainly no limit for *A. pygmaea* which is widely distributed throughout the Oriental region and is also found in Australia and on several Pacific islands.



Number of all localities: **175**

after 1990: **92**

Number of all records: **244**

after 1990: **139**

Mortonagrion ceylonicum Lieftinck, 1971

Sri Lankan Midget

ENDEMIC

One of the most enigmatic and strikingly beautiful Sri Lankan damselflies is the tiny *Mortonagrion ceylonicum*. It is only rarely seen and lives in dark swampy locations. The male's head has two conspicuous bright blue tear-shaped postocular spots, the thorax is brownish-black on the dorsum with bright blue stripes on the humeral sutures, fading to pale blue ventrally, and the abdomen is a blend of blackish brown and blue. The female, which is even more cryptic with a base colour of reddish brown and small amounts of blue, has been only recently described.

The species' presence in the island was anticipated for many decades before LIEFTINCK (1971a) finally provided a description of this handsome endemic, based on a single male, collected at Kadaimparu, south of Chilaw on the west coast. From the current perspective, it is clear that the female from Ambalangoda, mentioned by LAIDLAW (1924) without a genus or species name, also belongs to our Midget. If an unpublished record from Kalatuwawa Reservoir near Awissawella, where the species was found in September 1970 by Smithsonian researcher Oliver S. Flint is added, that is the complete overview of the scarce knowledge on the species we had until recently.

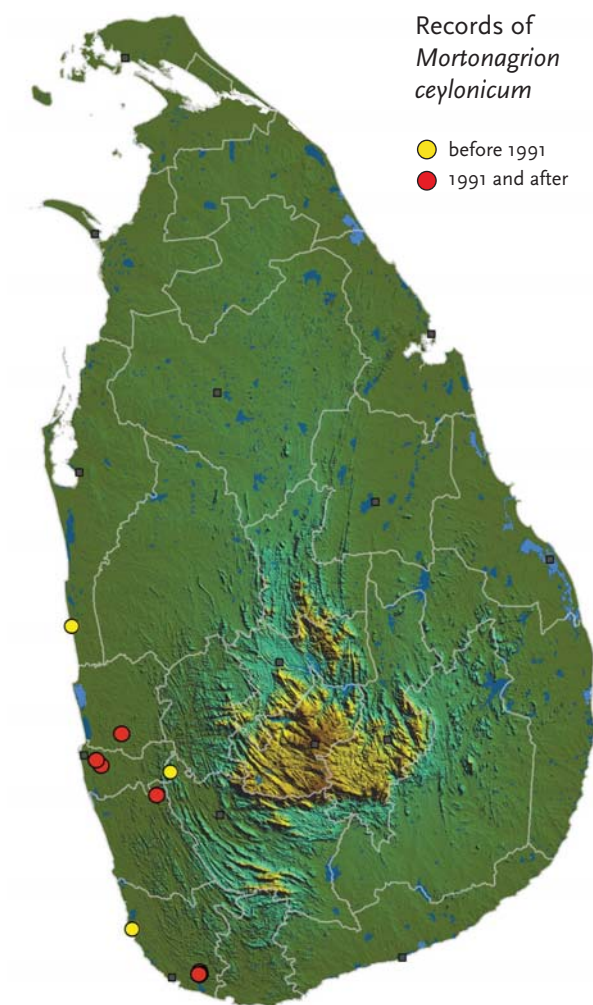
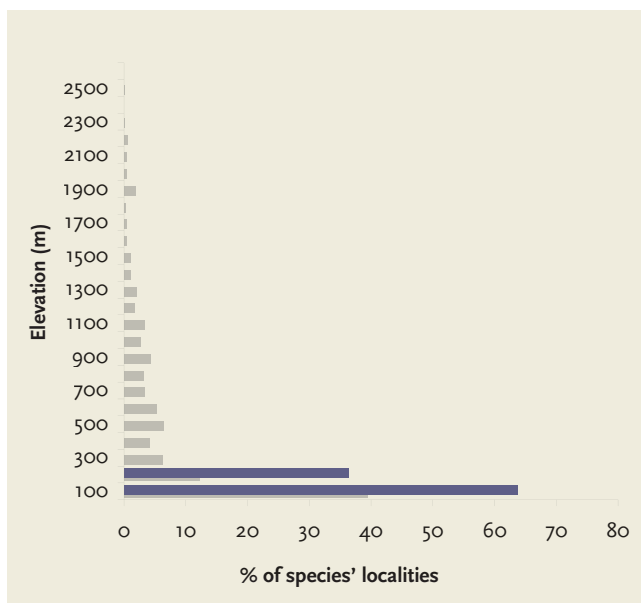
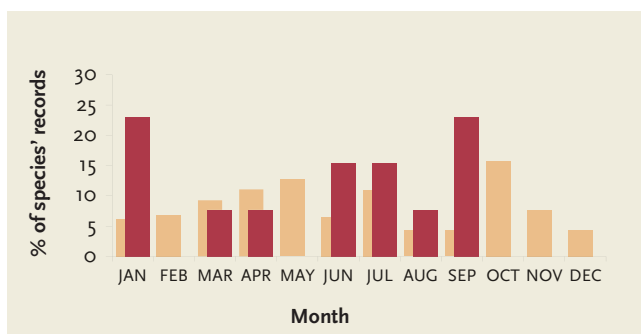
However, based on the work of Karen Conniff, Nancy van der Poorten and Sampath Gunasinghe, who recently provided the description of *M. ceylonicum* female, much more is now known on the species' biology, behaviour and habitat requirements (CONNIFF et al., 2011). They recorded it in Hiyare Forest Reserve and in the Kotte Swamps at the outskirts of Colombo, with records in February, April, July, August and September and recently also in January and June. The



latest new localities were discovered by a young Sri Lankan naturalist Divanka Randula, who observed the species in September 2011 near a natural pond in Bodhinagala and in March 2012 at Isigili Kanda, south of Gampaha.

M. ceylonicum inhabits dark swampy areas, flying in the thick brush, ferns or jungle, exclusively in the western lowlands of Sri Lanka. Its recording needs an experienced eye, and a superficial observer or photographer will almost certainly overlook these tiny jewels.

In any case, *M. ceylonicum* is obviously quite rare and threatened. VAN DER POORTEN & CONNIFF (2012) listed it recently as a nationally endangered species, describing also an evident example of its habitat degradation. Their view is also followed on the global level and the Data Deficient rank of *M. ceylonicum* as assessed by BEDJANIĆ (2009b) is changed to a globally threatened Endangered species according to IUCN Red List Criteria.



| | |
|------------------------------|----------------|
| Number of all localities: 11 | after 1990: 8 |
| Number of all records: 14 | after 1990: 11 |

| |
|---|
| Extent of Occurrence (EOO): 3,242 km ² |
| Area of Occupancy (AOO): 36 km ² |

% of records per period:



IUCN Red List Criteria: EN B1ab(iii)+2ab(iii)

IUCN Red List Category: ENDANGERED

References & Synonymy:

Mortonagrion ceylonicum, Lieftinck, 1971, Ent. scand. Suppl. 1: 197-198, 206, fig. 8.

? Genus ? Species - LAIDLAW (1924): 373; *Mortonagrion* spec. - LIEFTINCK (1955): 77; FERNANDO (1964): 190; FERNANDO (1990): 186; *Mortonagrion ceylonicum* - LIEFTINCK (1971a): 197-198, 206, fig. 8; LIEFTINCK (1971b): 123; FERNANDO (1974): 66; DAVIES & TOBIN (1984): 52; GEIJSKES & KIAUTA (1984): 25; TSUDA (1986): 33, 216; FERNANDO (1990): 260; TOL (1992): 62; BEDJANIĆ (1998): 10, 22, 58, 63-64, 67, 75; DE FONSEKA (2000): 11, 84, 203, 225, figs. B21a-b; IUCN SRI LANKA (2000): 25; BEDJANIĆ (2004): 283, 286; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2007): 15; WCSG (2008): 12, 15; BEDJANIĆ (2009b): www.iucnredlist.org; CONNIFF et al. (2011): 49-53, figs. 1-2; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 2,3, 5; *Mortonagrion* cf. *ceylonicum* - BEDJANIĆ et al. (2007): 58-59;

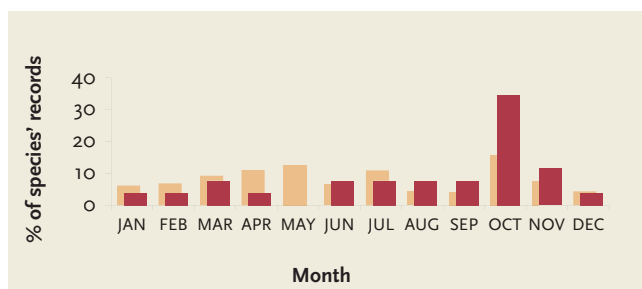
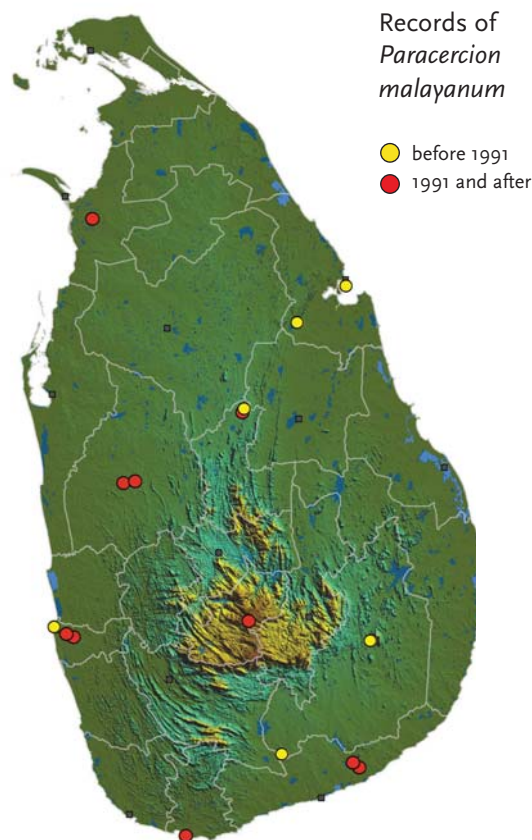
Faunistic records: APPENDIX 2, page 293-294;

Paracercion malayanum (Selys, 1876)

Malay Lilysquatter

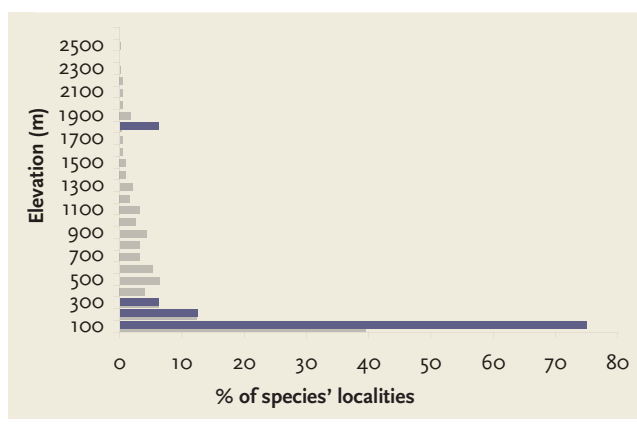
The usual place to see the small and delightful *Paracercion malayanum* is sitting on a lily pad in the middle of a pond or marsh. After *Amphiallagma parvum*, it is the second smallest of the blue damselflies. The male is bright blue and black, with characteristic comma-shaped blue postocular spots and bold black markings on the dorsum of the abdominal segments, except the terminal ones which are mostly blue. The female is similar but the ground colour is greenish-yellow with black markings and in contrast to *A. parvum* it lacks a prominent vulvar spine at the base of ovipositor.

All over its range, which extends eastwards to Java and the Philippines, *P. malayanum* is rather rarely recorded though probably often overlooked. In Sri Lanka, the recent records are widely scattered across the lowlands of the island, from Giant's Tank in the northwest, Sigiriya and Wariyapola in the north-western and north-central part, Talangama and Kotte near Colombo, to Kamburugamuwa and Tissamaharama on the southern coasts. Older unpublished records originate from Mahagama and Monaragala and published ones are from Kantalai and Trincomalee (LAIDLAW, 1924; LIEFTINCK, 1955). Of interest are multiple recent observations from the ponds of Nuwara Eliya (e.g. DE SILVA WIJEYERATNE, 2012), where this small species has obviously found its widely isolated mountain resort.



Number of all localities: **17** after 1990: **10**

Number of all records: **29** after 1990: **21**





Aciagrion occidentale Laidlaw, 1919

Asian Slim

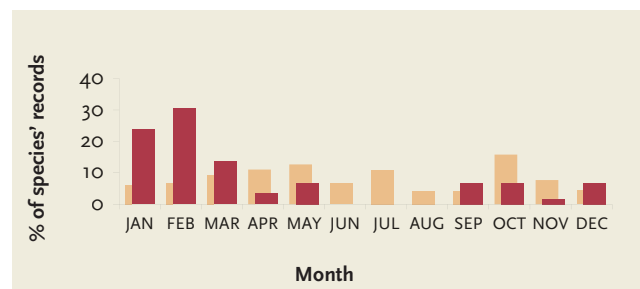
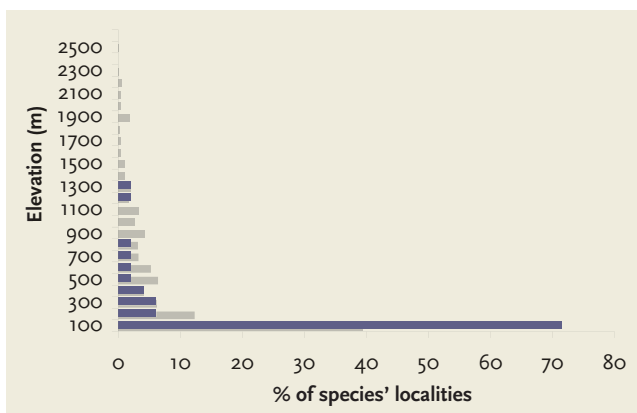
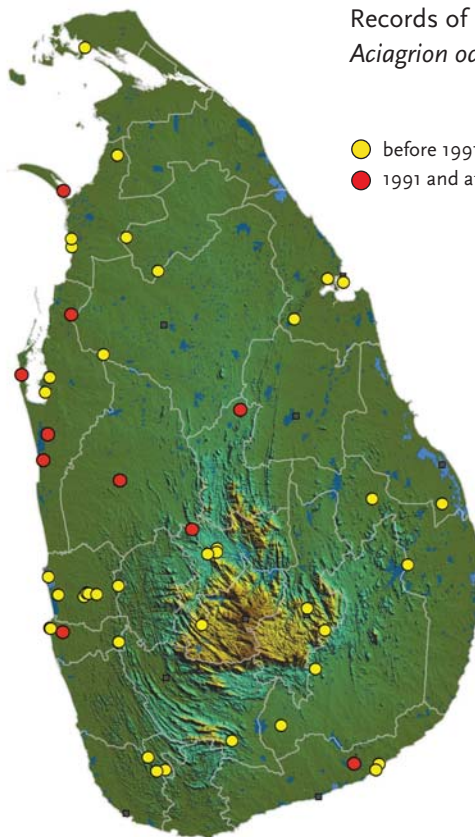
A fairly long abdomen and slender appearance are the trademarks of *Aciagrion occidentale*. Its ground colour is blue with black markings. The male has a characteristic black triangular spot on the dorsum of the eighth abdominal segment, and blue elongated postocular spots that are connected by a transverse line. Females are similarly coloured but with a stouter abdomen and different markings on the terminal abdominal segments.

A. occidentale is mostly seen near tanks, temporary pools and marshes. It occurs from Sri Lanka, throughout India to Cambodia, Thailand and Vietnam on the Malay Peninsula. Several decades ago it was reported as very common in south India from where FRASER (1933a) reports that “... In spite of its delicate build, it takes to migration readily, rising high in the air and taking advantage of its light weight and the use of aircurrents. Specimens have been taken over 40 miles out at sea off the western shores of India and Ceylon”.

The species' records are sparsely scattered all over Sri Lanka, however, contrary to the vast majority of the species covered in the present publication, the historical records of *A. occidentale* by far outnumber recent observations. It is possible that the use of agrochemicals plays a certain role in the apparent decline of populations, but the exact reasons are unknown and deserve special attention in the future.

Records of
Aciagrion occidentale

- before 1991
- 1991 and after



Number of all localities: 49

after 1990: 10

Number of all records: 59

after 1990: 11

Ischnura aurora rubilio Selys, 1876

Dawn Bluetail

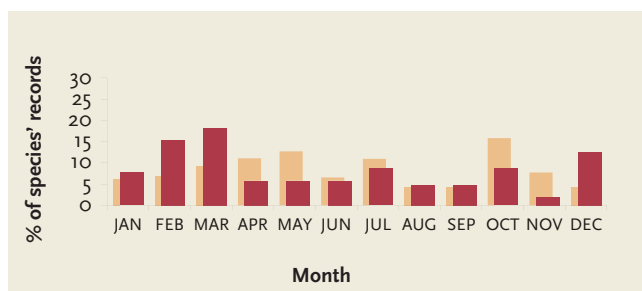
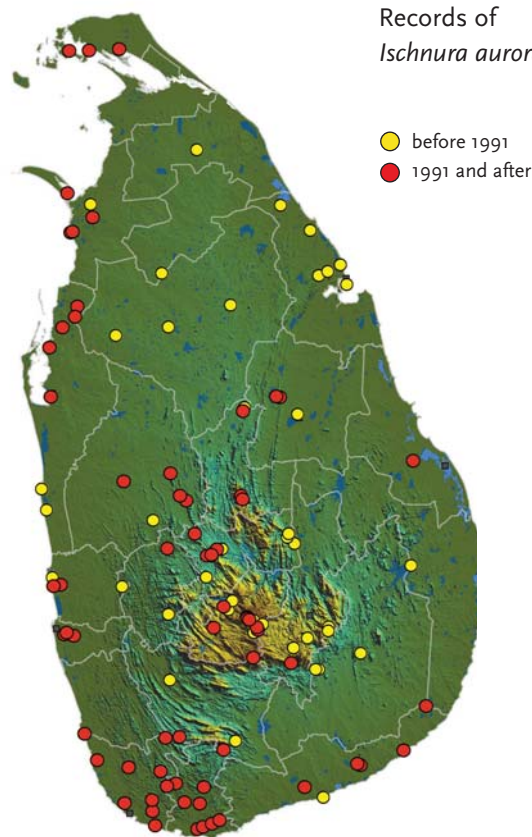
Striped apple green and black thorax and especially the bright yellow abdomen with azure blue and some black on the end segments makes the males of this small handsome damselfly more conspicuous than others of a similar size. Characteristic for the genus, the pterostigma of *I. aurora rubilio* males differs in both shape and colour, being wider and bicoloured in the forewing and smaller and pale coloured in the hindwing. As commonly seen in dragonflies in general, the female sex is much less attractive and pale in colour, without the beautiful yellow and blue.

It can be met with throughout the year all over Sri Lanka, predominantly in the plains but also in the hills and mountains up to 2,000 metres altitude. Resembling small yellow sticks with a blue tip, small males are not so easy to find but can be identified at a glance while floating through open grassy areas around ponds, paddy fields, ditches, and sometimes also brackish waters.

Only recently it has been stated that nominotypical *I. aurora* occurs in the Australo-Pacific region (PAPAZIAN et al., 2007; ROWE, 2010); the western populations, including Sri Lanka and India, at present are placed under the old Selys' name of *I. aurora rubilio* (PAPAZIAN et al., 2007).

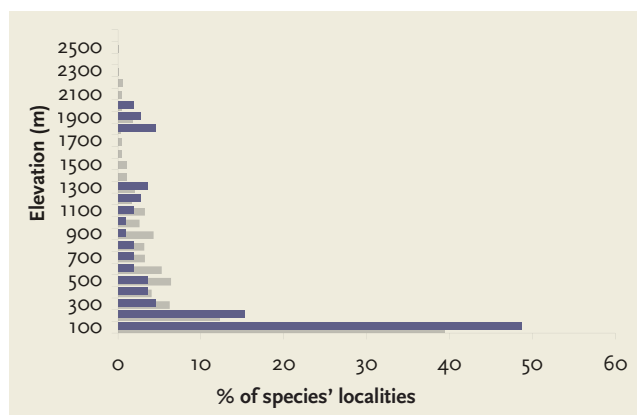


Records of
Ischnura aurora rubilio



Number of all localities: **114** after 1990: **66**

Number of all records: **136** after 1990: **78**





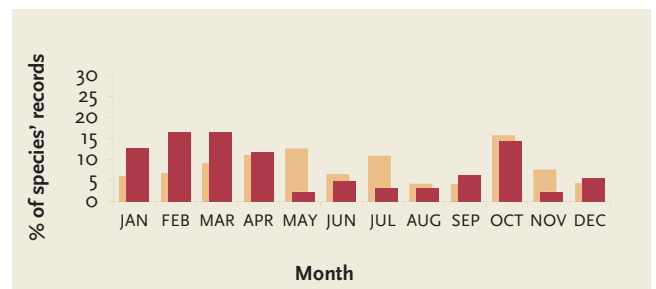
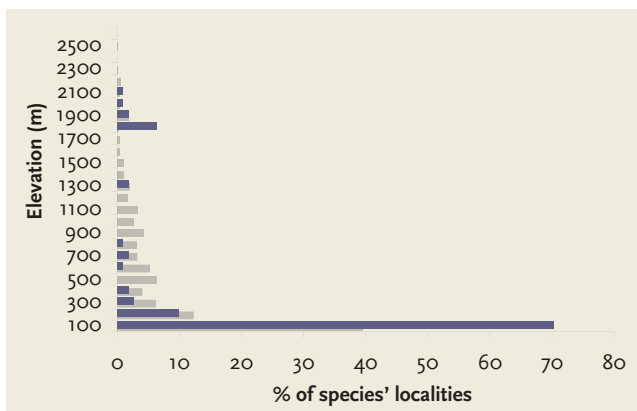
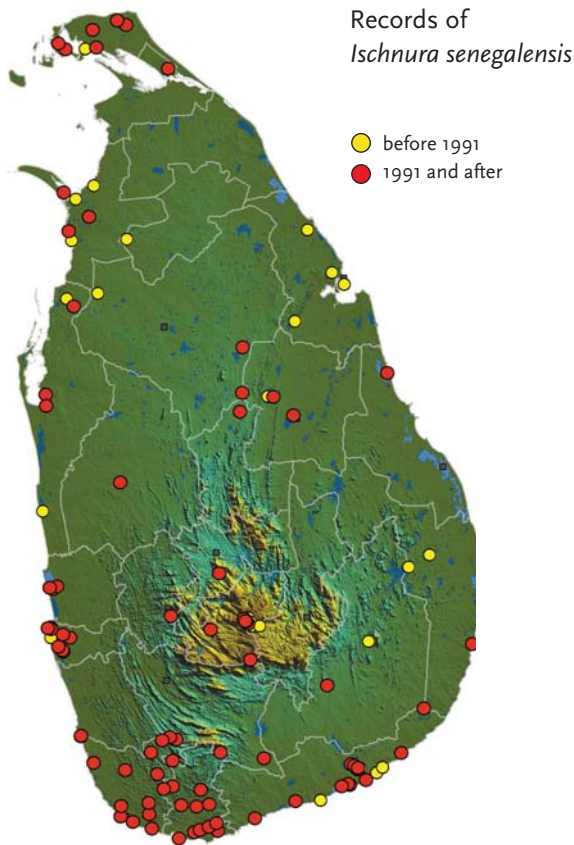
Ischnura senegalensis (Rambur, 1842)

Common Bluetail

This small Bluetail is extremely widely distributed and is found in Africa, the Middle East and in Asia as far east as Japan and Papua New Guinea.

Markings on the male of *Ischnura senegalensis* are distinctive, with two small bright blue postocular spots and a blue band close to the tip of the abdomen making it hard to mistake for any other damselfly in Sri Lanka. The females are another story as they appear in different colour forms. The isochrome female is almost identical to the male, with a blue marking close to the tip of the abdomen. The heterochrome female, shows extensive black especially on the dorsum of the thorax and abdomen with the sides pale green and no blue ornaments. The most attractive is the juvenile form of the latter, being beautifully bright orange or reddish on the head, most of the thorax and the first abdominal segments.

I. senegalensis is not very choosy regarding habitat and tolerates stagnant and brackish water. It prefers open grassy areas near canals, ditches, ponds, lakes and even lagoons. It flies all year in Sri Lanka and, similar to its congener, it is found predominantly in the plains, but also up to 2,000 metres, being very common around Nuwara Eliya.



Number of all localities: **116**

after 1990: **85**

Number of all records: **155**

after 1990: **109**

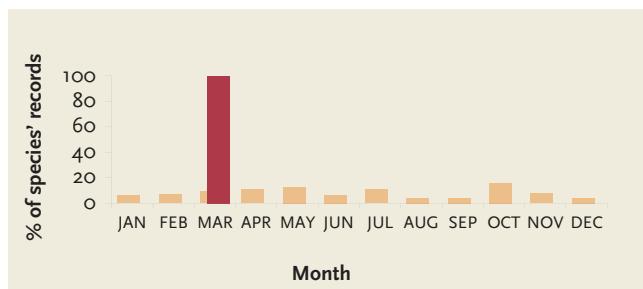
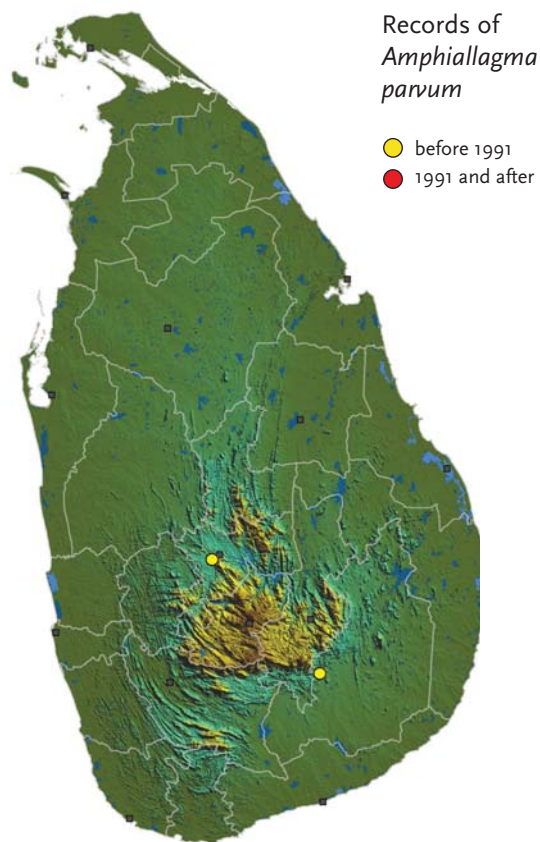
Amphiallagma parvum (Selys, 1876)

Little Blue

The title of the smallest in the group of blue damselflies in Sri Lanka undoubtedly goes to *Amphiallagma parvum*. It is really small, similar in size to the tiny Wisps.

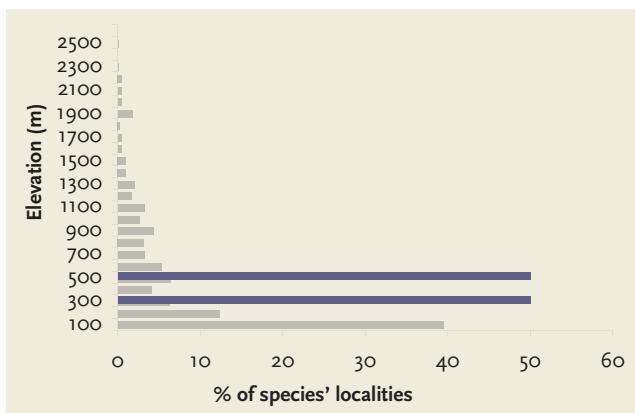
Due to its blue ground colouration with black markings it is most likely to be confused with *Paracercion malayanum*. Some differences peculiar to *A. parvum* include small blue postocular spots connected by a narrow stripe, a lower nodal index, thoracic sides without short black streaks along the upper part of the lateral sutures and differently shaped anal appendages of the males. Females have an isochrome and a heterochrome form. A well-developed ventral apical spine on the eighth abdominal sternite, at the base of the ovipositor, reliably separates *A. parvum* from the above mentioned *Paracercion*.

There are no records of the species from Sri Lanka in the last few decades and only two old records are known from the literature. It was collected in March 1962 in the vicinity of Peradeniya and Wellawaya by members of the Lund University Ceylon Expedition (LIEFTINCK, 1971a; BRINCK et al., 1971). *A. parvum* is widely distributed in India, from where FRASER (1933a) reports that it breeds in weedy tanks for most of the year. It is also known from Myanmar, Nepal and Thailand.



Number of all localities: 2 after 1990: 0

Number of all records: 2 after 1990: 0





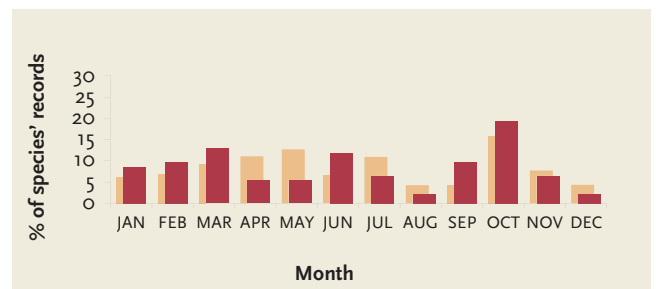
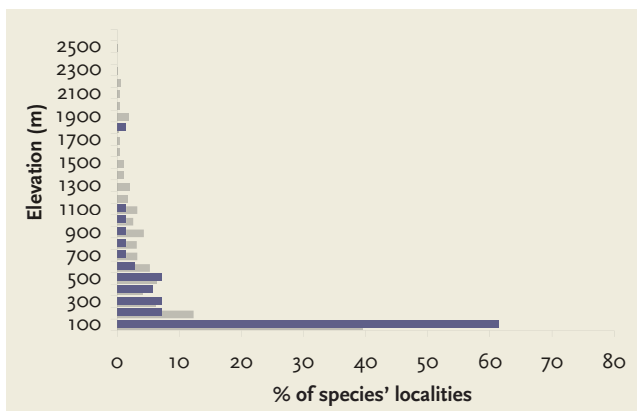
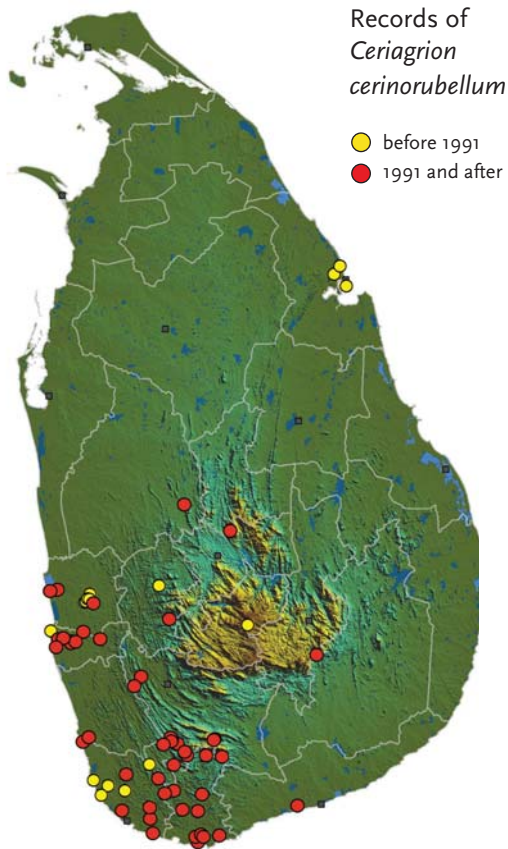
Ceriagrion cerinorubellum (Brauer, 1865)

Painted Waxtail

The beautiful contrast of fiery red and leaf green makes *Ceriagrion cerinorubellum* really amazing and different from any other species. The head and thorax of the male are mostly green but the abdomen begins with bright red, continues brownish on the dorsum and turns fiery red again towards its end. Females are very similar but their colours are more muted.

C. cerinorubellum is found in vegetation along shallow stagnant water pools, ponds or slow moving streams, often at the edge of the forest. It frequently preys on smaller damselflies such as *A. pygmaea* and butterflies. The adults have been seen all year around. The vast majority of its records come from the wet zone, save for a few exceptions, such as the 120 year old records from the surroundings of Trincomalee (KIRBY, 1894). Though labelled as a species of the plains and mid-elevations, there are some outliers, such as the decades old records from Victoria Park in Nuwara Eliya.

This attractive Waxtail occurs in the whole of South East Asia and reaches Indonesia in the east. However, *C. cerinorubellum* is linked with Sri Lanka by its taxonomic history, since almost 150 years ago the material for F. Brauer's original description was collected here (BRAUER, 1865a).



Number of all localities: **71**

after 1990: **54**

Number of all records: **114**

after 1990: **92**

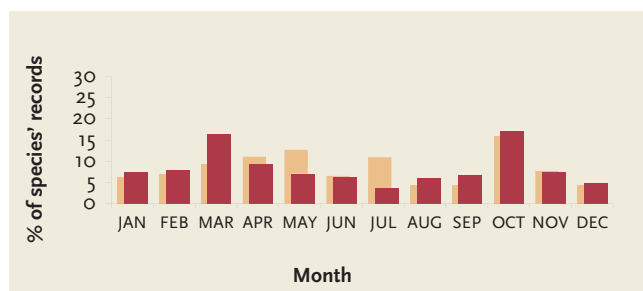
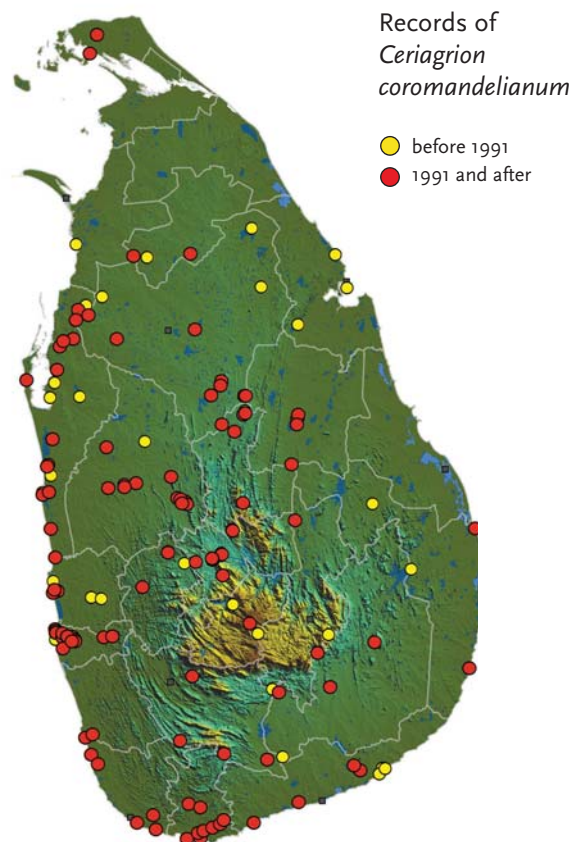
Ceriagrion coromandelianum (Fabricius, 1798)

Yellow Waxtail

One of the commonest and most easily identifiable damselflies in Sri Lanka is the bright yellow *Ceriagrion coromandelianum*. The male is yellow along the whole of the abdomen, often changing to a darker yellow on the last few segments, with vivid apple green on the head and thorax. Females, which dwell in shrubs and small bushes away from water, are far less brightly coloured.

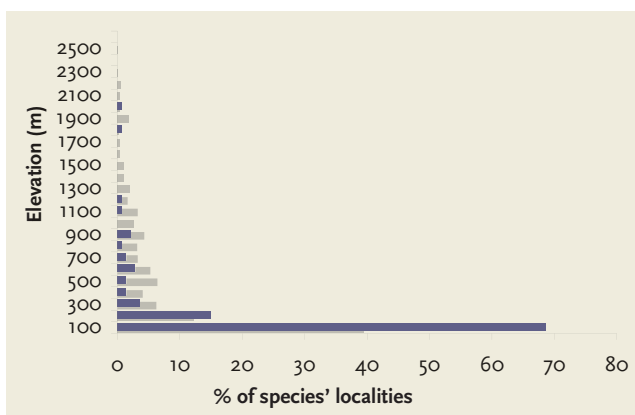
The species is commonly found around shrubs and grassy areas near ditches, canals, paddy fields, ponds, and lakes at lower elevations all around the island. It is multivoltine with two or three generations per year and adults can be seen in all seasons. Among grasses at the water's edge, both males and females will eagerly attack and devour smaller species of damselflies and butterflies.

The global range of *C. coromandelianum* is more limited than that of its congener, however, it is very common and widely distributed in India, Nepal and South China as in Sri Lanka.



Number of all localities: **146** after 1990: **107**

Number of all records: **285** after 1990: **195**





Pseudagrion decorum (Rambur, 1842)

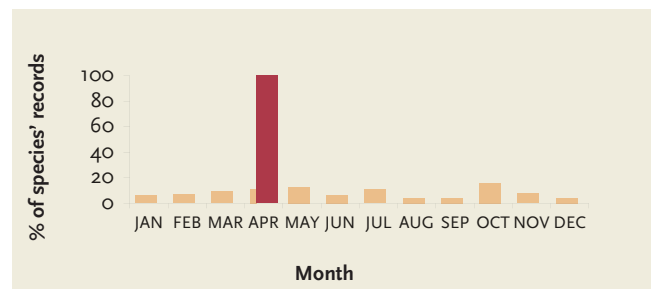
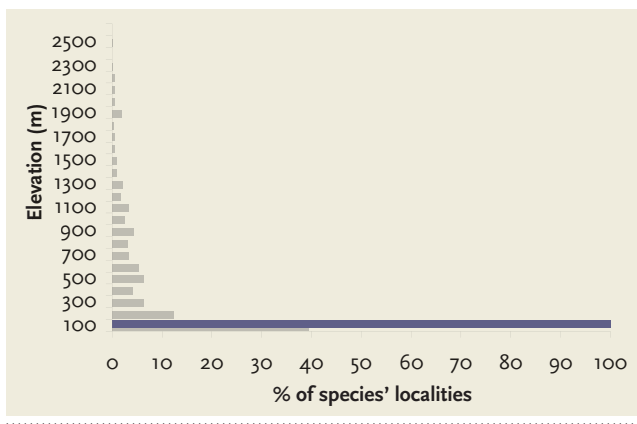
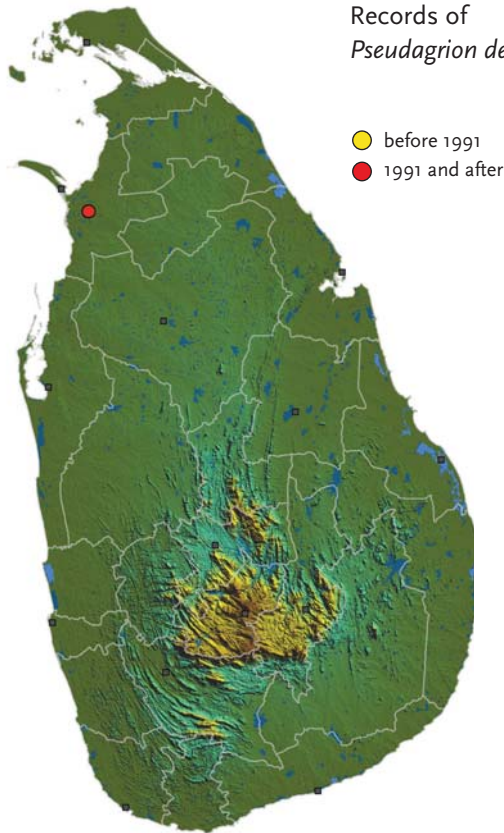
Azure Sprite

Based on its wide distribution in continental India and its migratory character, both FRASER (1933a) and DE FONSEKA (2000) speculated that *Pseudagrion decorum* should be found in the lowlands of Sri Lanka. But it wasn't until April 2006 when it was first recorded here—Gehan de Silva Wijeyeratne took a photograph of a male at Giant's Tank near Mannar, which was reproduced in BEDJANIČ et al. (2007). There have been no records since. However, the area of Giant's Tank is not well surveyed and though it is a Sanctuary and Protected Area, the habitat is quite disturbed.

The male of *P. decorum* can be identified by its pale blue colouring, thorax with three fine black lines on the mid-dorsal carinal ridge and by a black arrow-head-shaped marking on the dorsum of the second abdominal segment. The female is more greenish on the thorax, has a single fine black line on the mid-dorsum, no orange colouring on the head, and the second abdominal segment has similar markings to the male and the ninth abdominal segment has a quadrate black dorsal spot.

In India, *P. decorum* breeds in lakes and marshes and at least several decades ago it was known to migrate in large numbers on the west coast in September and October (FRASER, 1933a).

Records of
Pseudagrion decorum



Number of all localities: 1

after 1990: 1

Number of all records: 1

after 1990: 1

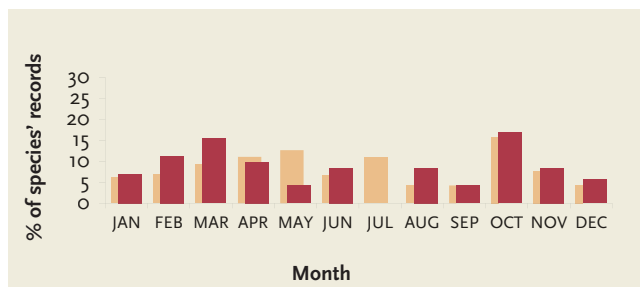
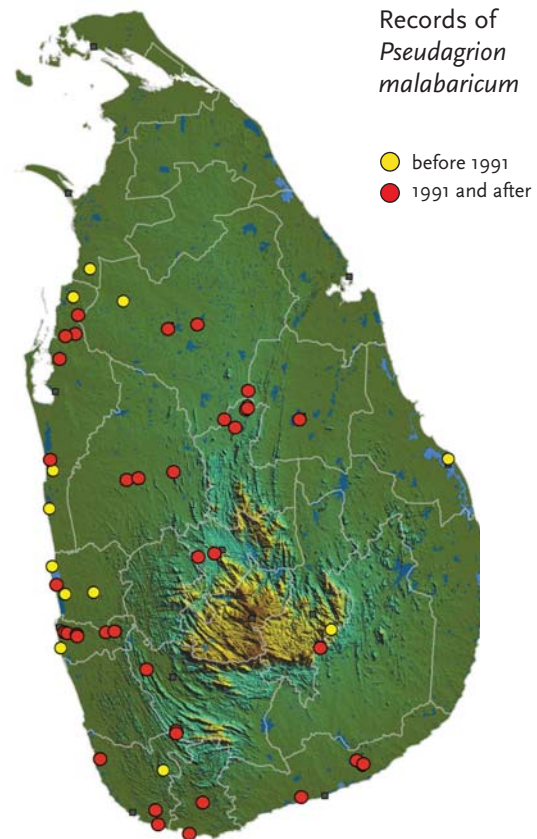
Pseudagrion malabaricum Fraser, 1924

Malabar Sprite

The Sprites look quite alike at first sight and *Pseudagrion malabaricum* was first described rather late, due to its colouration and markings being very similar to the widely distributed *P. microcephalum*. Apart from Sri Lanka, it is distributed throughout the Western Ghats and West Bengal of India as well as in Myanmar.

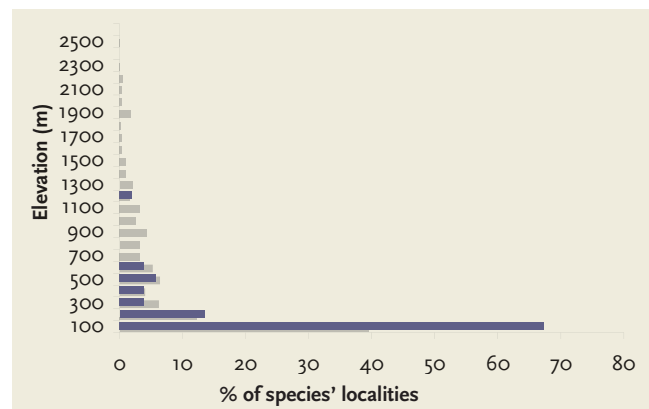
The shape of the superior anal appendages—being not bifid and with apices curled inwards—readily distinguishes *P. malabaricum*. In the field, the brown pterostigma in *P. malabaricum* can be a useful identification hint, but the markings on the second abdominal segment are not reliable. When in tandem or copulating, the determination task is easier since the females of *P. malabaricum* are decorated with a characteristic thick black stripe on the mid-dorsum of the thorax.

P. malabaricum is widely distributed over Sri Lanka though there are no records from the north and east which may be due to a lack of surveys. It is found from the lowlands to the mid-hills in a variety of habitats including tanks, marshes and paddy fields. During oviposition, the male holds onto the female who goes completely under water to lay eggs in plant material. Hereby, the male is also dragged quite low into the water and often literally “wets his feet” as well.



Number of all localities: **52** after 1990: **38**

Number of all records: **77** after 1990: **63**





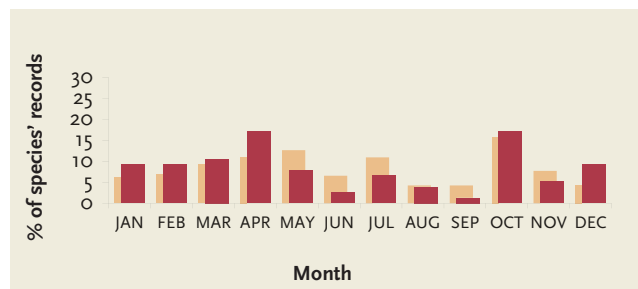
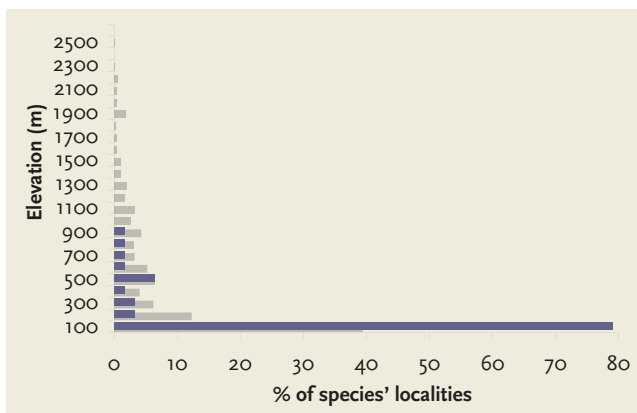
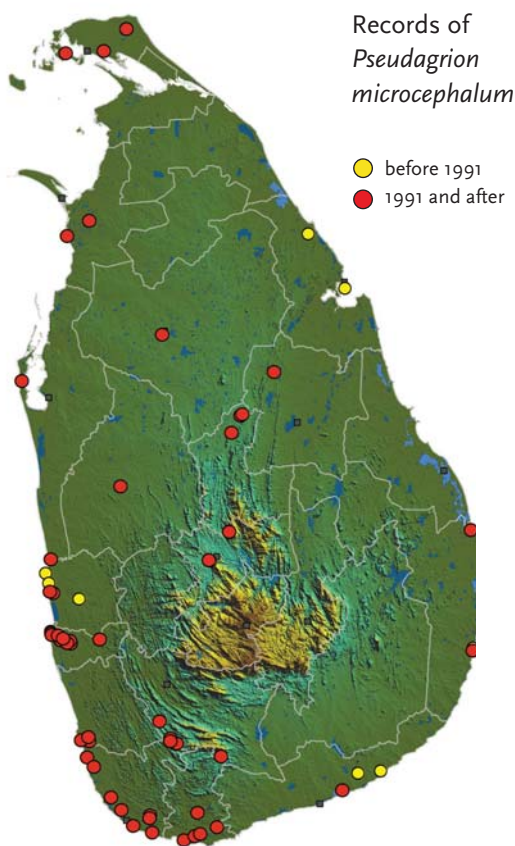
Pseudagrion microcephalum (Rambur, 1842)

Blue Sprite

Among its congeners *Pseudagrion microcephalum* has by far the widest distribution, reaching eastwards even to Japan, Papua New Guinea and Australia. FRASER (1933a) reported that in India it participated in migrations during September and October, moving in large numbers up the western coast. Such a phenomenon has not been reported in Sri Lanka.

The males are very similar to *P. malabaricum* at first sight. In *P. microcephalum* the pterostigma is coloured grey, large mid-dorsal blue spots on the prothorax are always present, and there are some differences in the black markings on the rest of the body, but only a closer inspection of the anal appendages will eliminate any doubts, since in *P. microcephalum* they are narrower, blue inside and clearly bifid. Female characteristics include some orange colouring on the upper surface of the head and eyes and a single fine black line on the mid-dorsum of the thorax.

In Sri Lanka, *P. microcephalum* is widely distributed over the country and the vast majority of records come from the plains. There are current records also from the Jaffna peninsula and the east coast (VAN DER POORTEN, 2011c) and old records from the Trincomalee area (LAIDLAW, 1924). It is found in a variety of habitats including tanks, marshes, irrigation channels, paddy fields and even brackish and polluted water.



| | |
|------------------------------|----------------|
| Number of all localities: 62 | after 1990: 52 |
| Number of all records: 86 | after 1990: 74 |

Pseudagrion rubriceps ceylonicum (Kirby, 1891)

Sri Lankan Orange-faced Sprite

ENDEMIC

Without doubt *Pseudagrion rubriceps ceylonicum* counts among the most attractive endemic damselflies of Sri Lanka. Its reddish-orange head, olive green thorax and the blue tip of the abdomen make it quite different at a glance from other Sprites. Even the female greatly resembles the male in colouring, adding fair beauty to the joint act of mating or the frequently-seen oviposition in tandem.

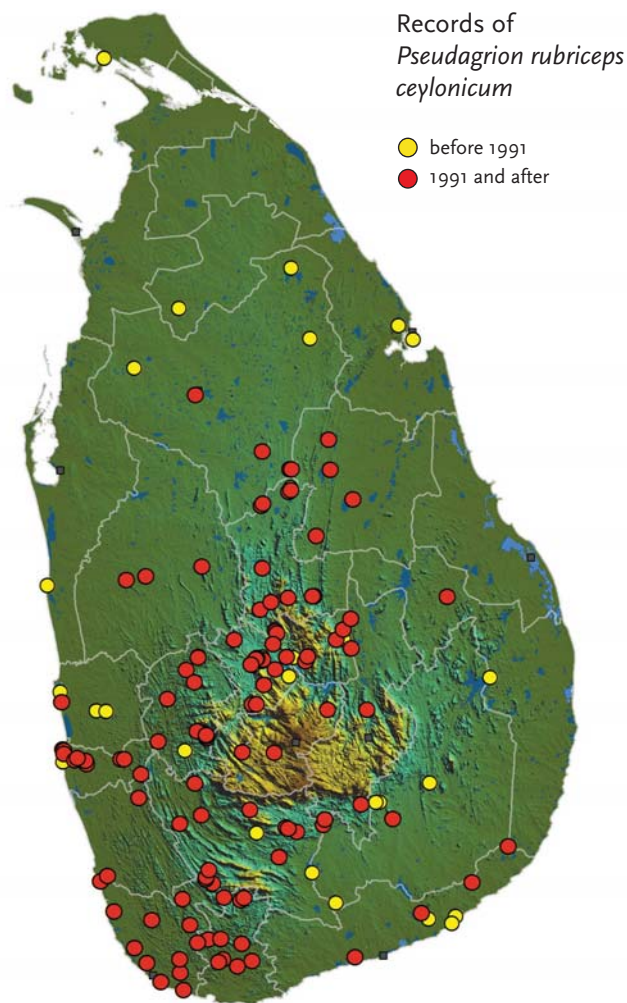
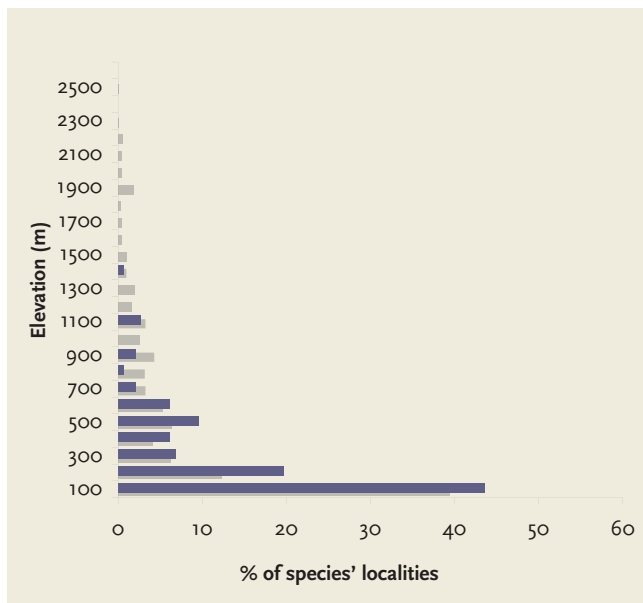
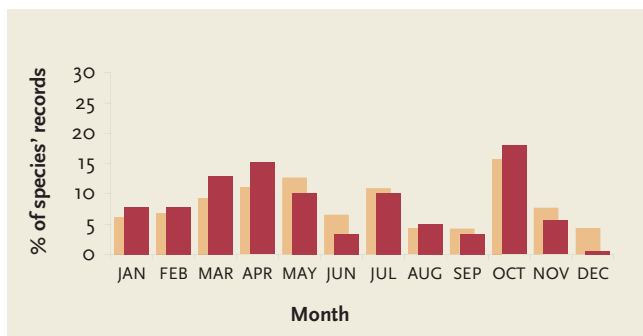
The nominotypical *P. rubriceps* is widely distributed from India to Taiwan, the Philippines and the Lesser Sunda Islands in Indonesia and differs from the insular subspecies in colouration, having black markings on the thorax, much less orange on the head and by females not resembling the males so closely (RIS, 1930, FRASER, 1933a). It is reported as multivoltine, found almost all the year round, with at least three generations. Females lay eggs above water level or in submerged vegetation, in twigs or the under surface of leaves in transverse rows (KUMAR, 1979). Similar observations on our endemic insular subspecies are scarcer and not much is known on its biology, larval ecology and behaviour.

In Sri Lanka, *P. rubriceps ceylonicum* inhabits different types of stagnant and flowing waters, ranging from weedy ponds and tanks, ditches, canals, streams, rivers, marshes and lagoons. It is



a species of the lowlands and mid-hills. The flight season of the adults stretches throughout the year. It is wonderful to see the orange-headed males hovering above the slowly flowing water, gliding around water plants in search of their mates or small prey. Hopefully, its beauty and commonness will stimulate naturalists to study it in much greater detail.

Since the amount of older data on the species' distribution is small, it is impossible to speculate on any changes in its range. Lack of fieldwork in lowland regions of the dry zone in the north might be the only real reason for not confirming the species' occurrence there in recent years. Elsewhere, *P. rubriceps ceylonicum* is still quite common and not threatened. As stated by VAN DER POORTEN & CONNIFF (2012) for the National Red List it currently fits into the IUCN category of Least Concern and at present it is safe to state the same for the global Red List assessment as well.



| | |
|-------------------------------|-----------------|
| Number of all localities: 149 | after 1990: 115 |
| Number of all records: 197 | after 1990: 154 |

| |
|--|
| Extent of Occurrence (EOO): 55,800 km ² |
| Area of Occupancy (AOO): 532 km ² |

% of records per period:

| 1850-1920 | 1921-1990 | 1991-2013 |
|-----------|-----------|-----------|
| 5 | 17 | 78 |

IUCN Red List Criteria: NOT APPLICABLE

IUCN Red List Category: LEAST CONCERN

References & Synonymy:

Archibasis ceylonica, Kirby, 1891, Proc. zool. Soc. Lond.: 205-206, pl. XX, fig. 4.

Archibasis ceylonica - KIRBY (1891): 205-206, pl. XX, fig. 4; KIRBY (1894): 564; KIRBY (1905): 272; LAIDLAW (1919): 194; *Pseudagrion rubriceps* - LAIDLAW (1924): 370; BAMBARADENIYA et al. (2002): 43.; CHANDANA et al. (2012): 70, 72; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 6; *Pseudagrion ceylonica* - RIS (1930): 15, 20-21; *Pseudagrion ceylanicum* - FRASER (1933a): 276, 299-300; *Pseudagrion rubriceps ceylonicum* - LIEFTINCK (1940): 81, 92-93; LAIDLAW (1951): 80; LIEFTINCK (1955): 74; FERNANDO (1964): 190; LIEFTINCK (1971a): 197, 206; FERNANDO (1990): 186; TOL (1992): 62; DE FONSEKA (2000): 12, 96-97, 101-102, 230-231, 283, pl. 5; BEDJANIĆ (2002): 4-6, 10; BEDJANIĆ & ŠALAMUN (2002): 2; DE SILVA WIJAYERATNE et al. (2003): pl. 2; BEDJANIĆ (2004): 283; CONNIFF (2004): 186; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2006): pl. 6; BEDJANIĆ et al. (2007): 16, 78-79; WCSG (2008): 15; WCSG (2009): 14; VAN DER POORTEN (2011c): 72; CONNIFF & BEDJANIĆ (2013): 190, 199-200; *Pseudagrion rubriceps ceylanicum* - TSUDA (1986): 39, 216; *Pseudagrion rubriceps ceylonica* - BEDJANIĆ (1998): 9, 14-15, 26, 58, 63-64, 67, 76, 80 – app. 5.1.];

Archibasis lieftincki Conniff & Bedjanič, 2013

Lieftinck's Sprite

ENDEMIC

Until recently, the genus *Archibasis* was not known in Sri Lanka and it was a great surprise when in 2001 and 2003 a few male specimens of an unknown *Archibasis* species were discovered in the southwestern part of Sri Lanka (BEDJANIČ, 2004; 2006). After more than ten years the species has finally received its official description under the name of *A. lieftincki*, honoring the renowned Dutch odonatologist M. A. Lieftinck and his immense odonatological work and important contributions to the knowledge of the dragonfly fauna of Sri Lanka (CONNIFF & BEDJANIČ, 2013).

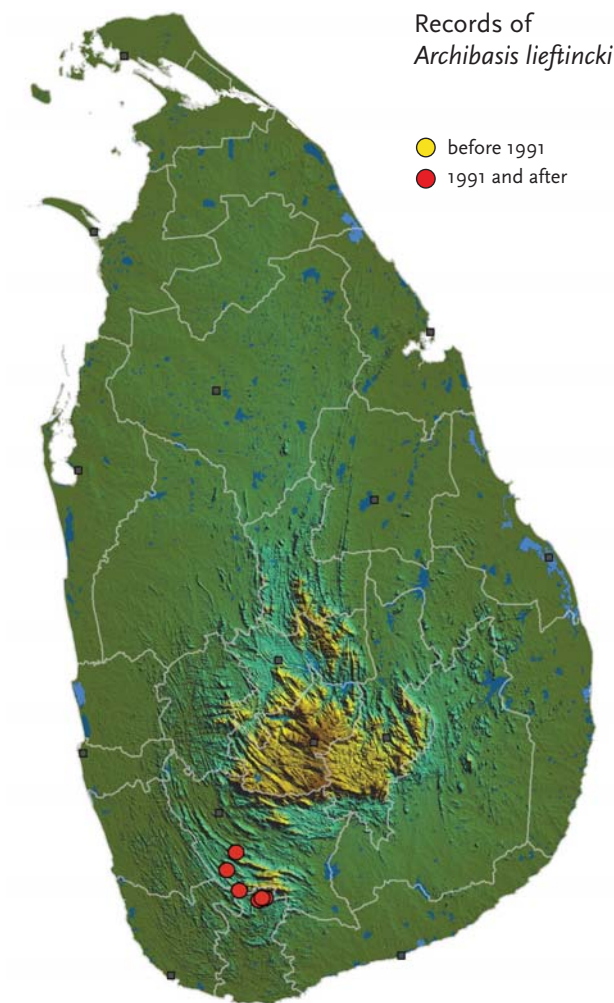
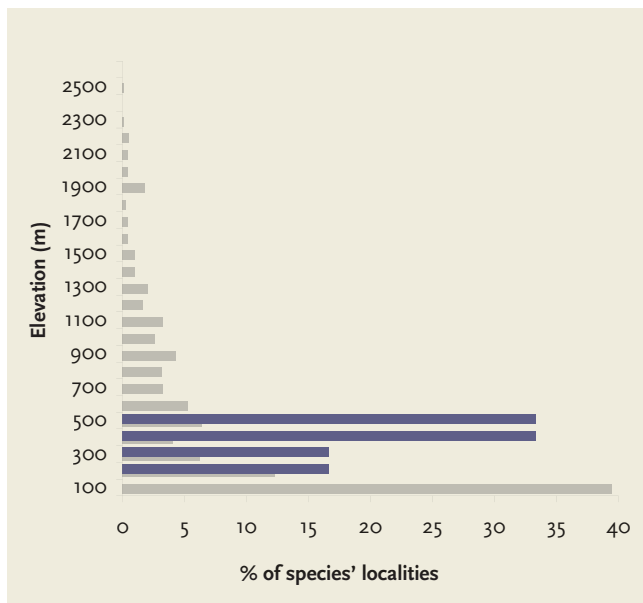
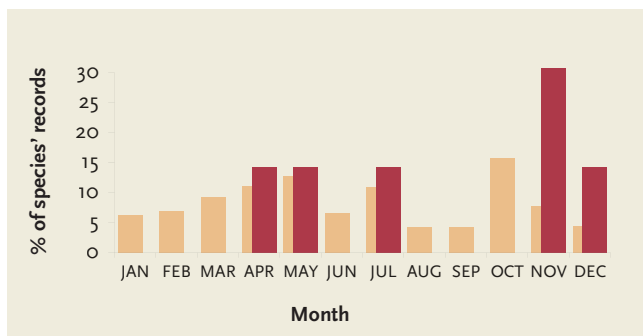
As with its following congener, *A. lieftincki* is also confined to Sri Lanka. Their general appearance, with a long slender body and attractive sky blue and black colours is very alike. However, *A. lieftincki* differs markedly from *A. oscillans hanwellanensis* by having very short inferior anal appendages of less than half the length of the superiors and considerably expanded flap-like superior anal appendages in the males. In females, the differences exist in the shape of the prothorax, and the abdominal markings, markedly those on the second, third and eighth abdominal segments.

According to available data, the range of *A. lieftincki* is very small. It has been found north and south of Sinharaja Forest Biosphere Reserve in the wet zone of southwestern Sri Lanka, in the vicinity of Weddagala, Delwala and in the Gin Ganga River and its tributaries around Deniyaya. Additional *Archibasis* records from Sinharaja, Kanneliya and Nakiyadeniya were reported in a study by the Galle Wildlife Conservation Society (WCSG, 2008). However, without voucher specimens and photographs it is impossible to ascribe these records to *A. lieftincki*.



The habitats of the species can be described as slow flowing streams and rivulets in partly disturbed landscapes, with a predominantly slow water flow, a sandy bottom and richly vegetated banks lined with shrubs and trees. Males are usually seen near the banks, often sitting on the vertical leaves of water plants, while the behaviour of females is virtually unknown.

Streams and small rivulets in the near vicinity of the lowland rainforests in southwestern Sri Lanka are the type of habitat which became increasingly rare in the last few decades. Ongoing expansion of tea plantations, clearing of natural forests, abundant use of agrochemicals and pollution are the risk factors that affect the habitats of *A. lieftincki* both directly and indirectly. Due to that and due to the very small extent of occurrence, the species is assessed as globally threatened and ranked in the category of Endangered according to the IUCN Red List criteria.



| | |
|-----------------------------|---------------|
| Number of all localities: 6 | after 1990: 6 |
| Number of all records: 7 | after 1990: 7 |

| | |
|-----------------------------|---------------------|
| Extent of Occurrence (EOO): | 136 km ² |
| Area of Occupancy (AOO): | 20 km ² |

% of records per period:

1850-1920 1921-1990 1991-2013



IUCN Red List Criteria: EN B1ab(iii)+2ab(iii)

IUCN Red List Category: ENDANGERED

References & Synonymy:

Archibasis lieftincki, Conniff & Bedjanič, 2013, *Odonatologica* 42(3): 189-194, 198-201, figs. 1-7, 13-14, 17.

Archibasis sp. nov. – BEDJANIČ (2004): 286; BEDJANIČ (2006b) in BAMBARADENIYA (2006): 23; *Archibasis lieftincki* – CONNIF & BEDJANIČ (2013): 189-194, 198-201, figs. 1-7, 13-14, 17;

Faunistic records: APPENDIX 2, page 294;

***Archibasis oscillans*
hanwellanensis
Conniff & Bedjanič, 2013**

Hanwella Sprite

ENDEMIC

Contrary to the superficially quite similar *Pseudagrion malabaricum* and *P. microcephalum*, the two *Archibasis* species, which were only recently discovered and described, are endemic to Sri Lanka (CONNIFF & BEDJANIČ, 2013). The long slender body and handsome mix of rich sky blue and black, eyes with an equatorial blue line, prominent blue eye spots and short diamond shaped pterostigma are the male's trademarks for both species. Females appear less blue, with green on the eyes, a brownish green prothorax, and thorax with blue lines on the dorsum and light blue on the sides, the abdomen being light brown with bronzed black on the dorsum and some sky blue on the last segments. Differences in the male anal appendages, the shape of the female's prothorax and the colour pattern on the first two and last abdominal segments are the most useful characters to reliably separate them.

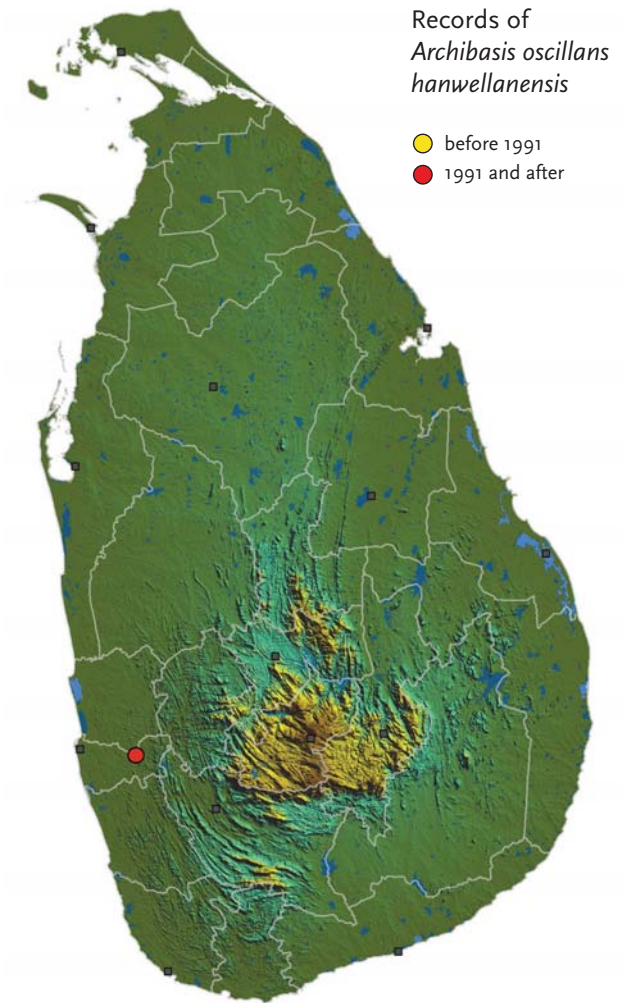
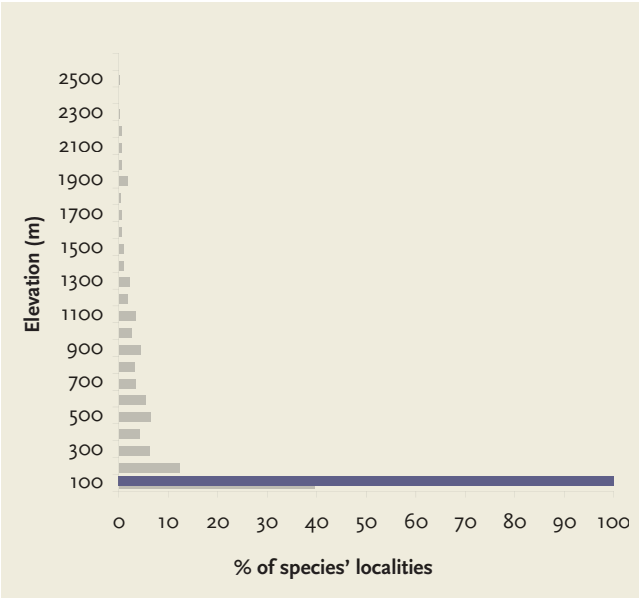
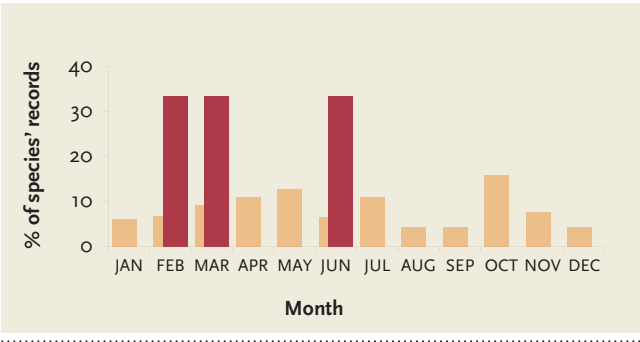
So far, *Archibasis oscillans hanwellanensis* has been recorded in only one location, the Meegahawatta wetland area near Hanwella, some 25 kilometres east of Colombo by Karen Conniff and Harshini Lankika Madumage in February, March and June 2011 (LANKIKA et al., 2012; CONNIFF & BEDJANIČ, 2013). The resemblance to *A. o. oscillans* is significant enough to designate it at the subspecific level until further research can be done. The nominotypical species occurs in western peninsular India, Assam, Myanmar, Thailand, Laos, Sumatra and Java (LIEFTINCK, 1949).

Though encounters with *A. oscillans hanwellanensis* have been very rare so far, details of their behaviour have been recorded. The males live along heavily



shaded swampy areas at the lower elevations near slow moving water. The female usually remains away from the water in the nearby dense brush. In February, males were found perched above the water and the females were inside the scrub area but in March females were found on the stream and along a drainage canal near the males. The extent of their habitat needs further study. Breeding has not been observed and no larvae have been found.

The evaluation of the species' threat status is problematic and rests on speculation. However, it is definitely rare and its type locality and also habitat type in general are under direct threat due to pressures of urbanization, agriculture and pollution. Unfortunately, the only known habitat was recently destroyed for agricultural development. Only further targeted fieldwork in the lowlands east of Colombo can bring more solid information on the species' populations in Sri Lanka. Until then, *A. oscillans hanwellanensis* is assessed as a Data Deficient species according to IUCN Red List criteria.



| | |
|-----------------------------|---------------|
| Number of all localities: 1 | after 1990: 1 |
| Number of all records: 3 | after 1990: 3 |

| | |
|-----------------------------|-------------------|
| Extent of Occurrence (EOO): | 4 km ² |
| Area of Occupancy (AOO): | 4 km ² |

% of records per period:

1850-1920 1921-1990 1991-2013



IUCN Red List Criteria: NOT APPLICABLE

IUCN Red List Category: DATA DEFICIENT

References & Synonymy:

Archibasis oscillans hanwellanensis, Conniff & Bedjanić, 2013, Odonatologica 42(3): 189-190, 194-201, figs. 8-12, 15-16, 17.

Archibasis sp. – LANKIKA ET AL. (2012): 37, 40-41; *Archibasis oscillans hanwellanensis* – CONNIF & BEDJANIĆ (2013): 189-190, 194-201, figs. 8-12, 15-16, 17;

Faunistic records: APPENDIX 2, page 294;





PLATYCYNEMIDIDAE

Featherlegs





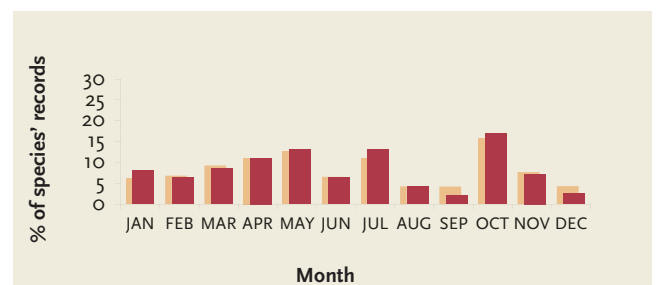
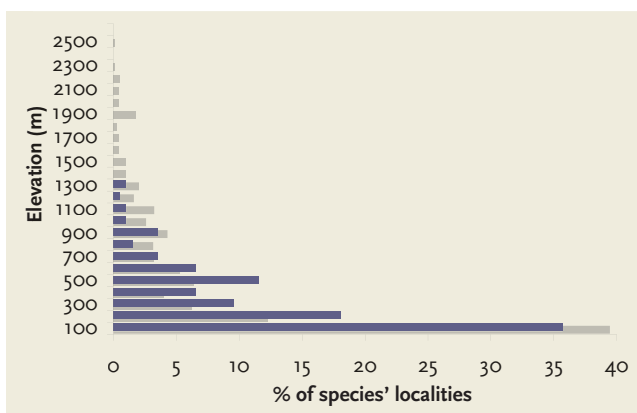
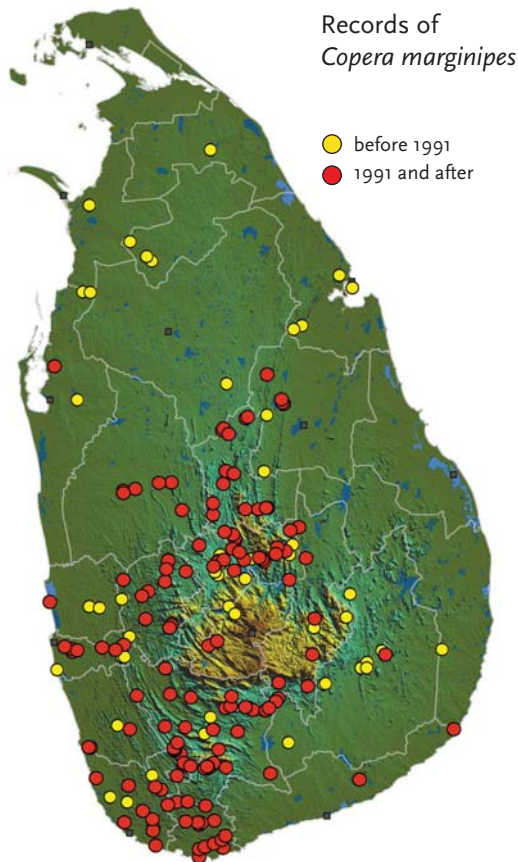
Copera marginipes (Rambur, 1842)

Rimmed Featherleg

While being the only representative of the family Platynemididae in Sri Lanka, *Copera marginipes* substitutes its lack of congeners by the array of varieties of colours and markings, developed not only according to the age of the individual but also locality. In an attempt to depict numerous variations, FRASER (1933a) even described one of these varieties as a “Ceylon form”.

Adult males are characterized by long yellow or bright orange legs and a black abdomen tipped with bluish white at its end, while females are light beige to brown. In contrast, freshly emerged and juvenile individuals are whitish. Not rarely, young females are eagerly seized by mature males for mating. The head bears a conspicuous stripe across the top of the vertex and another stripe, again coloured according to the insect’s age, passes through the centre of the eyes wrapping all around them like a band.

C. marginipes is usually found near various standing water habitats, drains, ditches and near human habitations at lower elevations. It is widely distributed in the Oriental region and very common in Sri Lanka as well.



Number of all localities: **200**

after 1990: **144**

Number of all records: **261**

after 1990: **180**





PLATYSTICTIDAE

Forest damselflies

Drepanosticta anamia Bedjanič, 2010

Ana Mia's Shadowdamsel

ENDEMIC

Sri Lanka's diversity of Platystictidae is remarkable on a global scale—a total of 21 exclusively endemic taxa are currently known from the island (BEDJANIČ, 2010; present publication). Since the range of all species is limited to only around 20,000 km² in the wet and intermediate zones in the southwestern and central parts of Sri Lanka, the island's prestigious label as one of the global Platystictidae »hotspots« (BEDJANIČ, 2010) is not an exaggeration.

Morphological as well as molecular analyses currently in progress show that Sri Lankan representatives of the genus *Drepanosticta* belong to different, clearly defined phylogenetic groups. One of the taxonomically and phylogenetically most interesting species, seemingly without any near allies, is the only recently described *Drepanosticta anamia*. It is a beautiful dark brown to almost black Shadowdamsel which is recognized by the characteristic orange-yellowish colouration of the prothorax, distinctive small nipples on the pronotum and by the peculiarly shaped inferior anal appendages of the male.

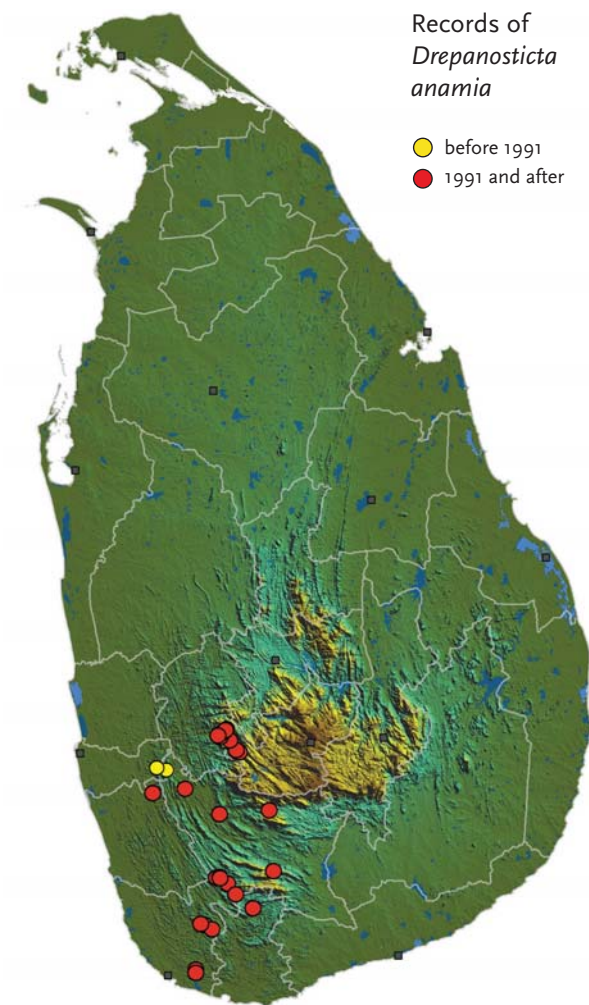
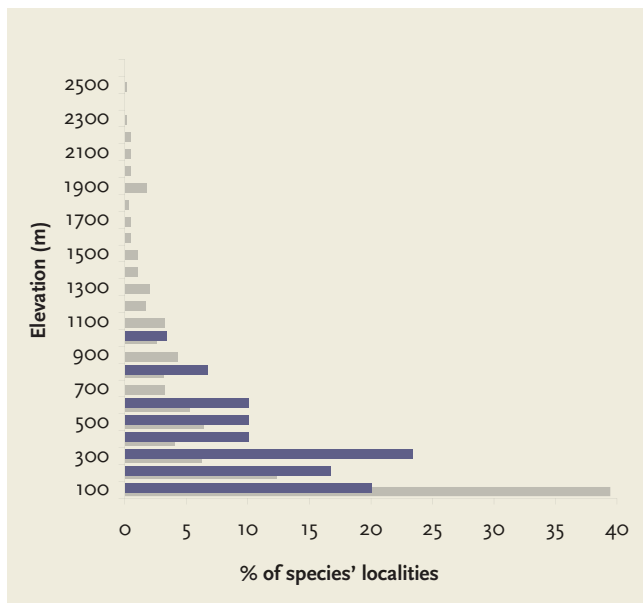
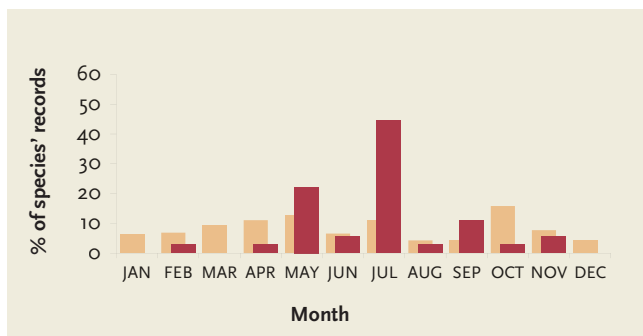
D. anamia is usually found hanging from leaves near small to mid-sized shaded streams in primary and secondary forests. When juvenile, due to the size, characteristic resting posture and whitish colour of the prothorax, the adults can be mistaken for a *Platysticta* by less experienced observers.

Its localities are grouped in forested areas and their surroundings around Kithulgala, Laxapana, Sinharaja and Kanneliya Forest Biosphere Reserves.



Some records from disturbed landscapes show that, at least in the short term, it can persist also in less optimal habitats that have a preserved corridor of trees and bushes along the streams.

It is surprising that during the Platystictidae-oriented fieldwork performed by Matjaž Bedjanič in 2012, despite quite wide altitudinal range of the species and despite the long flight season of adults from the end of April till November, *D. anamia* was found at only two new localities. In fact, potentially suitable habitats seem to be already severely fragmented and mainly left only as small pockets among vast areas of sterile tea plantations, clear-cut eroded slopes and fields. In future, as for almost all of its congeners, detailed assessment of distribution, estimation of population sizes and future monitoring are needed for this beautiful endemic Shadowdamsel. At present the species is assessed as globally threatened and ranked as a Vulnerable species according to IUCN Red List criteria.



| | |
|------------------------------|----------------|
| Number of all localities: 28 | after 1990: 24 |
| Number of all records: 35 | after 1990: 31 |

| | |
|-----------------------------|-----------------------|
| Extent of Occurrence (EOO): | 3,440 km ² |
| Area of Occupancy (AOO): | 92 km ² |

% of records per period:

1850-1920 1921-1990 1991-2013

| | |
|----|----|
| 11 | 89 |
|----|----|

IUCN Red List Criteria: VU B1ab(ii,iii)+2ab(ii,iii)

IUCN Red List Category: VULNERABLE

References & Synonymy:

Drepanosticta anamia, Bedjanič, 2010, *Odonatologica* 39(3): 185, 194-199, 200-204, figs. 11-15, 21-22, 25.

Drepanosticta sp. nov. A – BEDJANIČ (2004): 287; BEDJANIČ (2006b) in BAMBARADENIYA (2006): 23; *Drepanosticta anamia* - BEDJANIČ (2010): 185, 194-199, 200-204, figs. 11-15, 21-22, 25; BEDJANIČ et al. (2011): 5, 40; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 1, 7;

Faunistic records: APPENDIX 2, page 294;

Drepanosticta adami (Fraser, 1933)

Adam's Shadowdamsel

ENDEMIC

For a long time, *Drepanosticta adami* was known only from the type locality in Madugoda near Urugalla, where F. C. Fraser collected the type series at the beginning of May 1932 (FRASER, 1933b). For more than seven decades it remained one of the most enigmatic Shadowdamsels, due to its rarity and restricted distribution. It is the only *Drepanosticta* distributed exclusively in the Knuckles mountain range and its outskirts in the north-central part of the island.

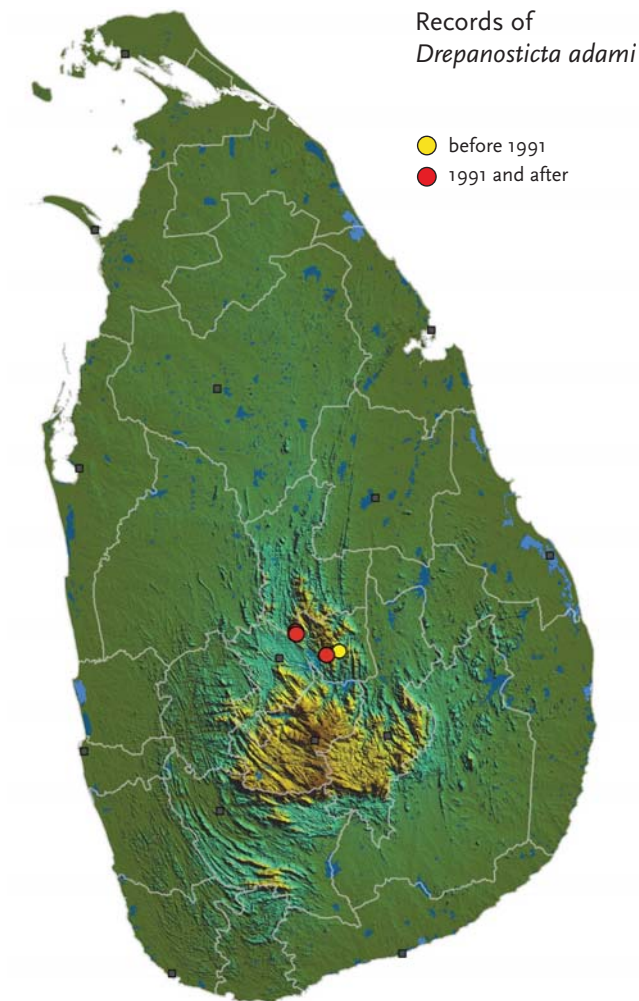
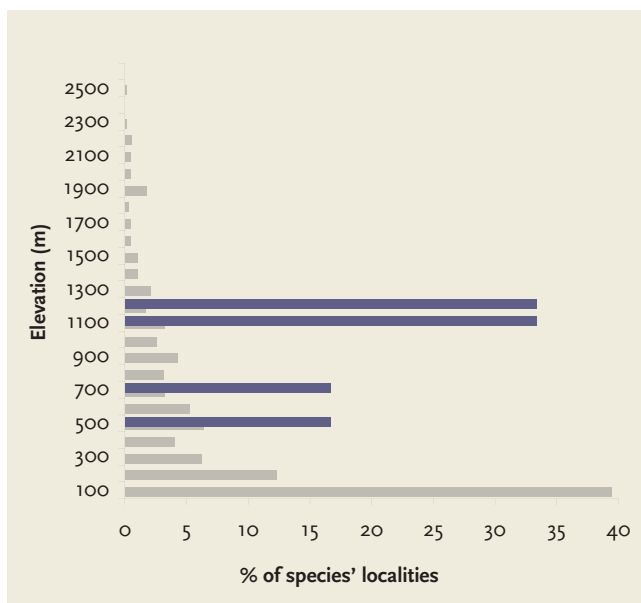
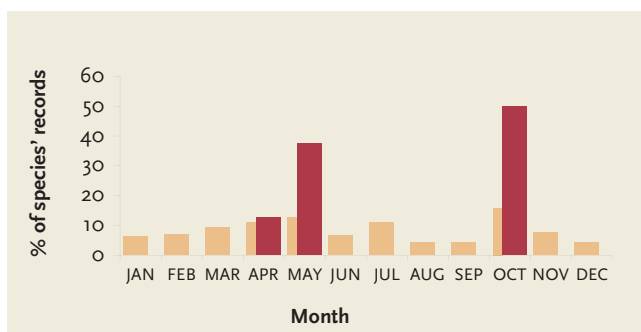
Finally Karen Conniff succeeded in finding and photographing *D. adami* in Simpson's Forest near Hunas Falls in April 2006, with additional records in October 2007 and 2010. During a joint excursion, Karen Conniff and Matjaž Bedjanič managed to observe a single juvenile female near Urugalla at the end of May 2009. The only remaining records are those of Matjaz Bedjanič, again from the two nearby streams in Simpson's Forest in October 2012.

In each case, only single individuals were observed and almost nothing is known of their biology and behaviour. Although *D. adami* is quite easily distinguished from all others of the genus by the white or light blue median lobe of the prothorax and the characteristic spoon-shaped dilatation of the apices of the inferior anal appendages in the males, it obviously lives a very secret life in the darkly shaded vicinity of small trickles and is difficult to



spot. FRASER (1933b) picturesquely describes his field efforts and the species' habitat as follows "...A male was observed hiding in maiden-hair fern in a small cleft in the hill side through which a trickle of water fell. The hill above was densely clothed in jungle but forcing my way up through this, in deep twilight I found the males along the course of the seepage, visible only by the blue identification area on the end of the abdomen. No ray of sunlight penetrated this stygian gloom and if it had not been for the betraying, perambulating, blue spot, it would have been impossible to see the insects..."

Deforestation, water extraction and most probably also climate change are directly and negatively affecting the habitats of *D. adami*. Due also to its small range, it is one of the most threatened endemic damselflies in Sri Lanka. It is declared as nationally (VAN DER POORTEN & CONNIFF, 2012), as well as globally a Critically Endangered species (BEDJANIČ, 2006a).



| | |
|-----------------------------|---------------|
| Number of all localities: 5 | after 1990: 4 |
| Number of all records: 7 | after 1990: 6 |

| | |
|-----------------------------|--------------------|
| Extent of Occurrence (EOO): | 47 km ² |
| Area of Occupancy (AOO): | 12 km ² |

% of records per period:

1850-1920 1921-1990 1991-2013

| | |
|----|----|
| 14 | 86 |
|----|----|

IUCN Red List Criteria: CR B1ab(ii, iii)+2ab(ii, iii)

IUCN Red List Category: CRITICALLY ENDANGERED

References & Synonymy:

Ceylonosticta adami, Fraser 1933, Ceylon J. Sci. (B) 17(3): 203, 211-213, fig. 6.

Ceylonosticta adami - FRASER (1933b): 203, 211-213, fig. 6; *Drepanosticta adami* - LIEFTINCK (1955): 70; KIMMINS (1966): 176-177; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1984): 104; TSUDA (1986): 1, 213; TOL (1992): 27; BRIDGES (1994): VII.3; BEDJANIĆ (1998): 9, 27, 59, 63, 67, 76; DE FONSEKA (2000): 12, 57-58, 206, 283, figs. B40a-b; IUCN SRI LANKA (2000): 25; BEDJANIĆ (2004): 283, 287, 289; BEDJANIĆ (2006a): www.iucnredlist.org; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23, 25; BEDJANIĆ et al. (2007): 16; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 6; *Drepanosticta adamsi* (sic!) - FERNANDO (1964): 190; FERNANDO (1990): 186; IUCN SRI LANKA & MOENR (2007): 46;

Faunistic records: APPENDIX 2, page 295;

Drepanosticta austeni Lieftinck, 1940

Austin's Shadowdamsel

ENDEMIC

Until the break of the millennium, the inconspicuous *Drepanosticta austeni* had been known only from the original description provided by M. A. Lieftinck, who found a small colony of the species in September 1938 at Passara (LIEFTINCK, 1940).

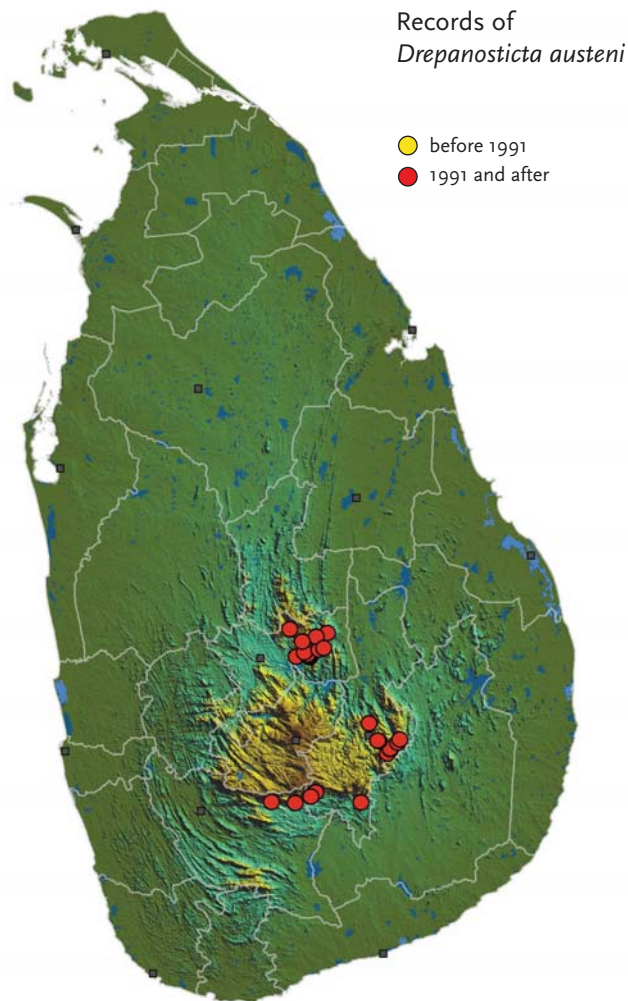
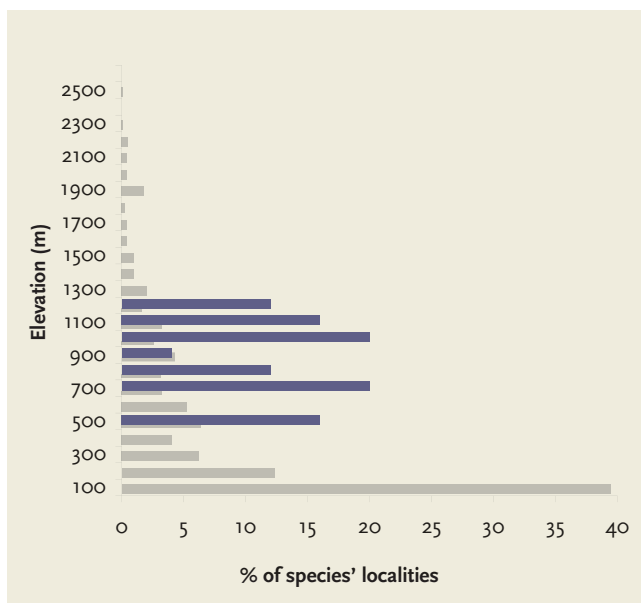
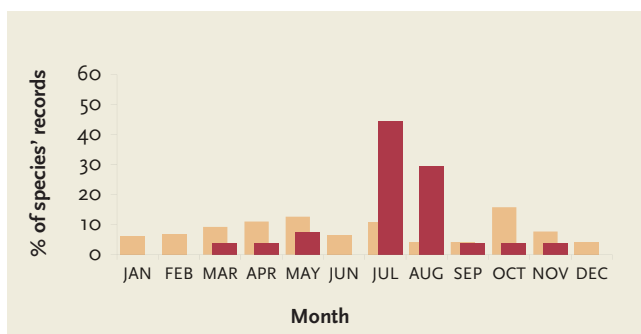
Several decades later the species was re-discovered by Matjaž Bedjanič at Diyaluma Falls near Koslanda in October 2001 and April 2003. In May, July and August of 2009 it was more frequently encountered — first quite surprisingly at Urugalla in the southern outskirts of the Knuckles as well as at some localities in the surroundings of Badulla and Passara and further to the southwest at Suratalie waterfall next to the Belihuloya-Haputale road. In the latter region, Karen Conniff photographed *D. austeni* along a rivulet at Bambarakanda Ella in March 2011. The final set of new records was contributed by M. Bedjanič in July and November 2012, discovered in the course of fieldwork supported by the Rufford Foundation. He succeeded in finding new localities for the species in the southeastern parts of the Knuckles and also recorded it at Belihuloya and at a small stream with a waterfall some kilometres northwest of Balangoda, delineating herewith the currently known western limit of its range. It is now known that the species is seasonal and can be met on the wing from March to November.

D. austeni belongs to the group of smaller Shadowdamsel species and is closely related to the superficially very similar *D. brincki*, *D. nietneri* and *D. digna*. Without closer inspection of the anal appendages in the male and the prothorax in the female it is not easy to tell all these species apart. However, *D. austeni* is less contrastingly coloured, has a light brownish blue prothorax and a very ill-defined narrow pale bluish or greenish brown middorsal stripe on a rusty brown thorax. In males, the dorsal apical blue marking is



sharply limited to the last two abdominal segments while the superior and inferior anal appendages are of almost the same length, the latter having marked inwardly directed subapical projections, similar to, but not as pronounced as in *D. digna*.

A lot of new knowledge on the distribution of *D. austeni* was collected only in the past few years, therefore the ranking of the species as a globally and nationally Critically Endangered species (BEDJANIČ, 2006a; VAN DER POORTEN & CONNIFF, 2012) luckily proved to be too pessimistic. However, despite the fact that its extent of occurrence is quite wide, its area of occupancy is limited to clusters of badly destroyed landscapes along the outskirts of the Knuckles, the eastern hills around Passara and Badulla and the southern to southeastern outskirts of the Central Highlands. In this somewhat drier part of the island, the pressure on water resources for agricultural and domestic use is high and the encroachment of the remaining forests is still ongoing. Therefore, *D. austeni* is still considered globally threatened but is ranked among Vulnerable species according to the IUCN criteria.



| | |
|------------------------------|----------------|
| Number of all localities: 29 | after 1990: 28 |
| Number of all records: 31 | after 1990: 30 |

| |
|---|
| Extent of Occurrence (EOO): 2,885 km ² |
| Area of Occupancy (AOO): 88 km ² |

% of records per period:

1850-1920 1921-1990 1991-2013

| | |
|---|----|
| 3 | 97 |
|---|----|

IUCN Red List Criteria: VU B1ab(ii,iii)+2ab(ii,iii)

IUCN Red List Category: VULNERABLE

References & Synonymy:

Drepanosticta austeni, Lieftinck, 1940, Ceylon J. Sci.(B) 22(1): 89-91, fig. 2.

Drepanosticta austeni - LIEFTINCK (1940): 81, 89-91, fig. 2; LIEFTINCK (1955): 70; FERNANDO (1964): 190; LIEFTINCK (1971a): 206; LIEFTINCK (1971b): 77; DAVIES & TOBIN (1984): 105; TSUDA (1986): 1, 213; GEIJSKES & KIAUTA (1984): 36; FERNANDO (1990): 186; TOL (1992): 46; BRIDGES (1994): VII.25; BEDJANIĆ (1998): 10, 27, 59, 63, 67, 76; DE FONSEKA (2000): 12, 65, 206, figs. B41a-b; IUCN SRI LANKA (2000): 25; BEDJANIĆ (2004): 283, 287, 289; BEDJANIĆ (2006a): www.iucnredlist.org; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23, 25; BEDJANIĆ et al. (2007): 16; IUCN SRI LANKA & MOENR (2007): 46; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 6;

Faunistic records: APPENDIX 2, page 295;

Drepanosticta bine Bedjanič, 2010

Bine's Shadowdamsel

ENDEMIC

Another recently described Shadowdamsel, *Drepanosticta bine* is distinguished at a glance from all of its congeners by its brown head, robust rounded tubercles densely covered with setae on the pronotum, brown to dark greenish brown body and its beautiful green, blue and brown eyes. It is related to *D. montana* and *D. submontana* which, however, have only a small chocolate brown patch on the vertex and front of the occiput, obtuse tubercles on the superior anal appendages of the male and clearly defined light stripes on the sides of the thorax. In *D. bine*, the latter are totally reduced or present only as narrow, largely obscured blue stripes (BEDJANIČ, 2010).

The species is currently known from over 20 localities, all confined to Sri Lanka's wet zone. The largest cluster of records is known from the surroundings of Kithulgala and Laxapana but it has also been recorded from Bodhinagala, Kalatuwawa Reservoir, Haycock range, Sinharaja, Hiyare and other locations (BEDJANIČ, 2010). During the course of the fieldwork done by Matjaž Bedjanič in 2012, supported by the Rufford Foundation, *D. bine* was found at 6 new localities around Balangoda and Pundaluoya.

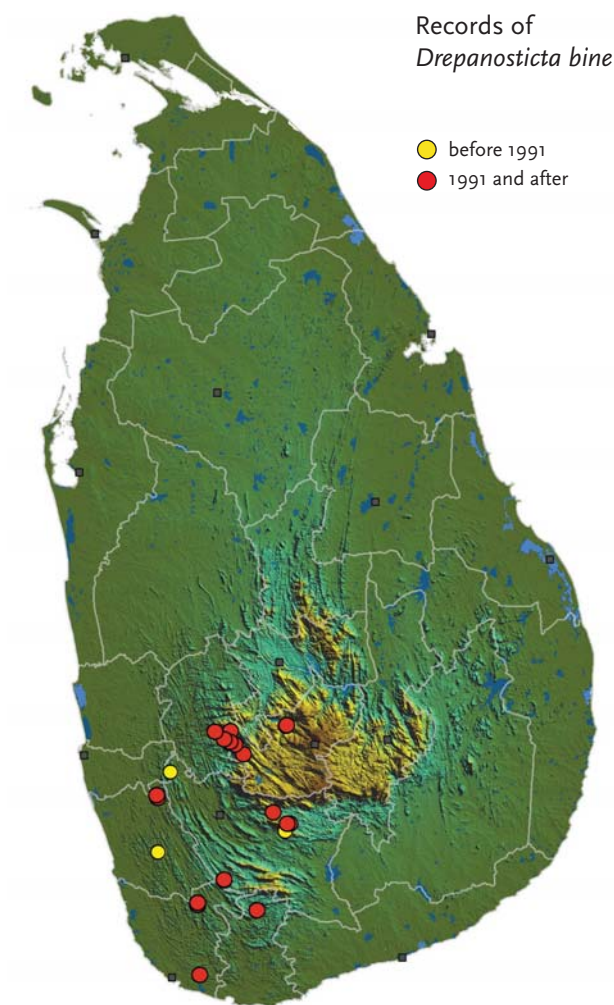
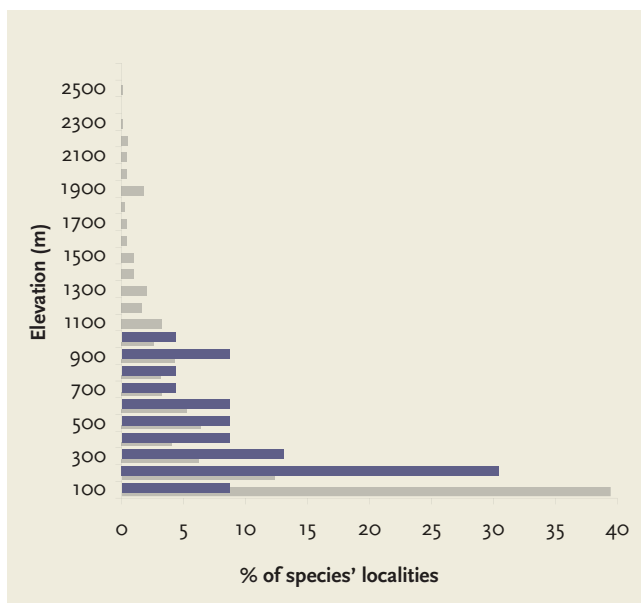
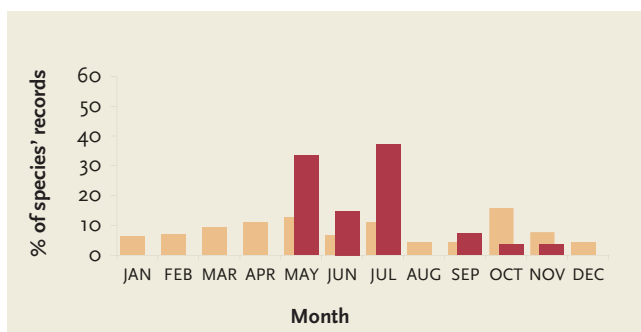
Its localities range widely in altitude from the lowlands up to 1,000 metres. Phenologically, the flying period of *D. bine* adults fits the general Platystictidae pattern in Sri Lanka, i.e. from May-



July until September- November, which traditionally corresponds with the start and end of the monsoon period in the southwestern part of the island.

Minor water habitats in dense rainforests, such as trickles, marshy springs and very small streams, are typical habitats of *D. bine*, but apparently it also inhabits well shadowed seeps in secondary forests. In such habitats, individuals can be found near the ground or clinging onto leaves or twigs a few decimetres from the ground. Two other congeners, *D. lankanensis* and *D. brincki*, are also observed quite frequently in such habitats.

The habitats of this species share the same sombre fate as those of most of its congeners—fragmentation and destruction. Due to the estimation that populations of *D. bine* are already severely fragmented and isolated, and due to the small area of occupancy, according to IUCN Red List criteria the species is evaluated as globally threatened and ranked as Vulnerable.



| | |
|-------------------------------------|-----------------------|
| Number of all localities: 23 | after 1990: 19 |
| Number of all records: 27 | after 1990: 23 |

| |
|---|
| Extent of Occurrence (EOO): 4,274 km² |
| Area of Occupancy (AOO): 72 km² |

% of records per period:



IUCN Red List Criteria: **VU B1ab(ii,iii)+2ab(ii,iii)**

IUCN Red List Category: **VULNERABLE**

References & Synonymy:

Drepanosticta bine, Bedjanič, 2010, *Odonatologica* 39(3): 185, 190-194, 198-204, figs. 6-10, 19-20, 24.

Drepanosticta bine - BEDJANIČ (2010): 185, 190-194, 198-204, figs. 6-10, 19-20, 24; BEDJANIČ et al. (2011): 5, 41; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 1, 7; *Drepanosticta montana* - BEDJANIČ et al. (2007): 90-91;

Faunistic records: APPENDIX 2, page 295-296;

Drepanosticta brincki Lieftinck, 1971

Brinck's Shadowdamsel

ENDEMIC

Drepanosticta brincki is a small, charming, rusty brown and sky blue Shadowdamsel, described relatively late by M. A. Lieftinck, based on material collected near Ratnapura in February 1962 by the members of the Lund University Ceylon Expedition (LIEFTINCK, 1971a).

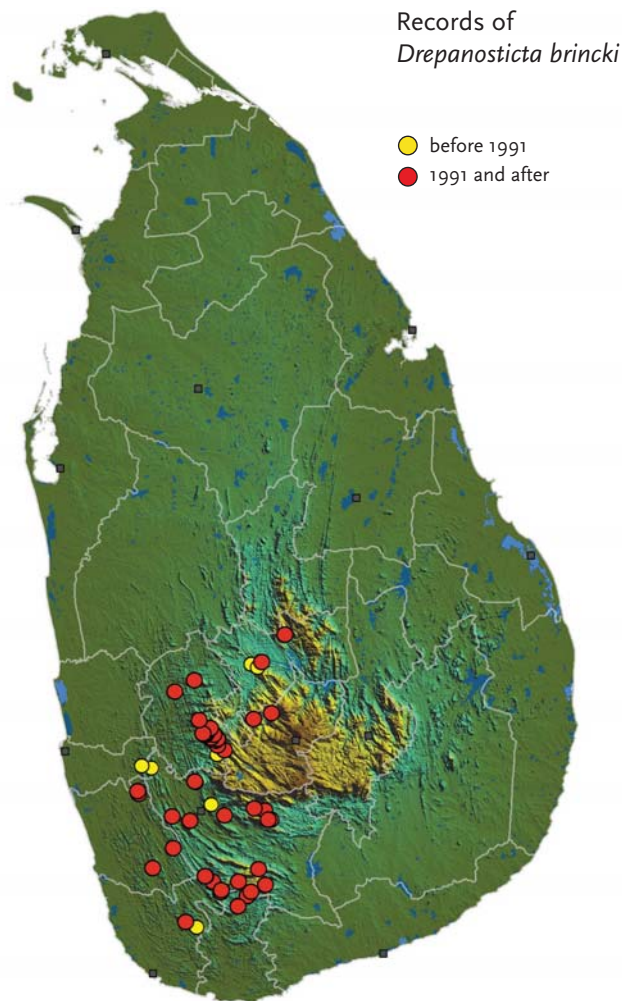
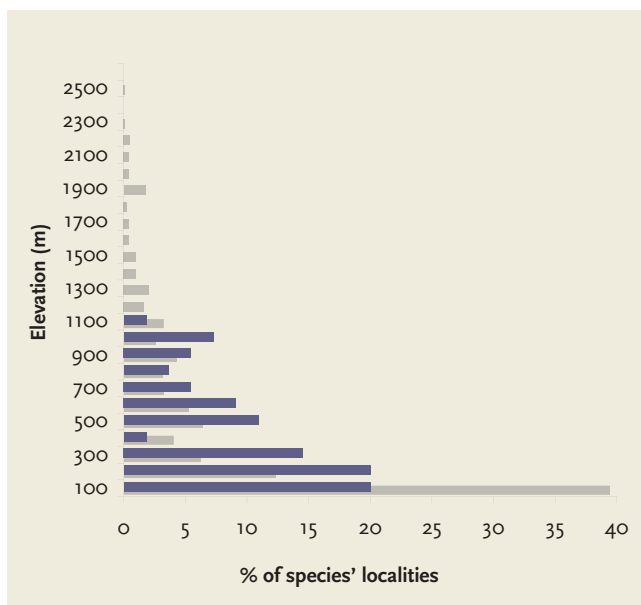
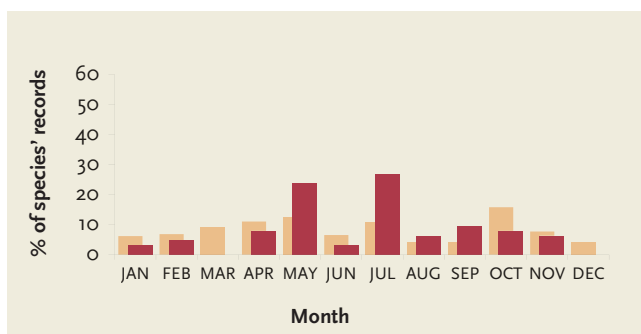
Of the smaller Shadowdamsels so far described, *D. brincki* stands out at a glance by the uniformly rusty brown coloured dorsum of the thorax, which lacks the prominent sky blue mid-dorsal stripe of *D. nietneri* and *D. digna* and the narrower, palely defined mid-dorsal bluish colouration of *D. austeni*. However, the rusty brown of *D. brincki* still has plenty of beautifully contrasting blue ornaments — the dorsal portion of its eyes above the broad brown equatorial belt is greyish-blue, while the dorsal surface of the prothorax, lateral thoracic stripe and abdominal markings are all beautifully coloured sky blue. In males, the inferior anal appendages are apically widened, hollowed out interiorly, with a crescent-shaped emargination, without the conspicuous subapical inwardly directed projections of *D. digna* and *D. austeni*.

The distribution of *D. brincki* comprises the southwestern and central part of the island and in the north it reaches the surroundings of Kandy. An isolated record is even known from the southwestern outskirts of the Knuckles. It occurs from the lowlands to the mid-hills and adult insects can be observed nearly all year. It is moderately common in suitable habitats across its range and is the second commonest Sri Lankan Shadowdamsel species. It inhabits small streams in forested areas and adults



can be found resting on leaves and stems near the ground even at considerable distances from its larval habitat. The easiest way to spot this small damselfly is to go along paths crossing streams or rivulets, which are obviously utilized as corridors among the jungly undergrowth of low growing bushes and ferns.

Although VAN DER POORTEN & CONNIFF (2012) listed the species as Critically Endangered in the recently published National Red List, the odds for its future survival seem less sombre than for many of its congeners. Although the majority of records of *D. brincki* originate from areas with preserved remnants of rainforest it can obviously persist also in small pockets of suitable habitat in corridors of natural vegetation along small streams and seepages. Despite continuous habitat loss, it is presently considered as an unthreatened Least Concern species on the global level. However, the status of its populations requires monitoring in future years.



| | |
|------------------------------|----------------|
| Number of all localities: 55 | after 1990: 45 |
| Number of all records: 63 | after 1990: 51 |

| |
|---|
| Extent of Occurrence (EOO): 5,501 km ² |
| Area of Occupancy (AOO): 176 km ² |

% of records per period:



IUCN Red List Criteria: NOT APPLICABLE

IUCN Red List Category: LEAST CONCERN

References & Synonymy:

Drepanosticta brincki, Lieftinck, 1971, Ent. scand. Suppl. 1: 190-191, 206, figs. 2a-c.

Drepanosticta brincki - LIEFTINCK (1971a): 190-191, 206, figs. 2a-c; LIEFTINCK (1971b): 122; FERNANDO (1974): 66; GEIJSKES & KIAUTA (1984): 36; TSUDA (1986): 1, 213; FERNANDO (1990): 260; TOL (1992): 56; BRIDGES (1994): VII.38; BEDJANIĆ (1998): 10, 15, 27-28, 59, 63, 67, 76; DE FONSEKA (2000): 12, 65-66, 207, figs. B42a-c; IUCN SRI LANKA (2000): 25; BEDJANIĆ (2002): 1, 6, 10-11, 17; BEDJANIĆ (2004): 283, 287; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2007): 16; 86-87; BEDJANIĆ (2010): 211, 212; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 6; *Drepanosticta brinki* (sic!) - DAVIES & TOBIN (1984): 105;

Drepanosticta digna (Hagen, 1860)

Noble Shadowdamsel

ENDEMIC

The first of the Sri Lankan Shadowdamsels were described more than 150 years ago by H. A. Hagen in E. de Selys-Longchamps' *Synopsis des Agrionines* (HAGEN in SELYS, 1860b) and *Drepanosticta digna* was one of them. However, despite its enviable “taxonomic age”, information on its distribution and biology remains very poor.

D. digna is the most colourful of the earlier mentioned company of small endemic Shadowdamsels. Both sexes have a bronzed black top of the head, beautiful azure blue eyes with a broad brick red equatorial belt, bright brick red to brown thorax with distinct azure blue mid-dorsal and lateral thoracic bands and a dark blackish brown abdomen which bears distinct dorsal azure blue markings. Structurally, the males differ from all other companions by the shape of the inferior anal appendages, which are considerably shorter than the superiors and expanded towards the apex on the inner side with a robust spine directed straight inwards. The females are characterized by the peculiar shape of the posterior lobe of the prothorax with its apical trapezoidal border directed obliquely upwards and backwards (FRASER, 1933b; LIEFTINCK, 1940).

Detailed records of the species in the literature are scarce and the only locations mentioned are Haragama (LAIDLAW, 1924) and Urugalla (FRASER, 1933b; LIEFTINCK, 1940). In 1970, Oliver S. Flint collected the species in the Peradeniya Botanic Gardens. Matjaž Bedjanič found it near Gampola in 2003, at Urugalla and near Kandy in 2009, while Karen Conniff and M. Bedjanič also recorded it in Kithulgala in 2009.

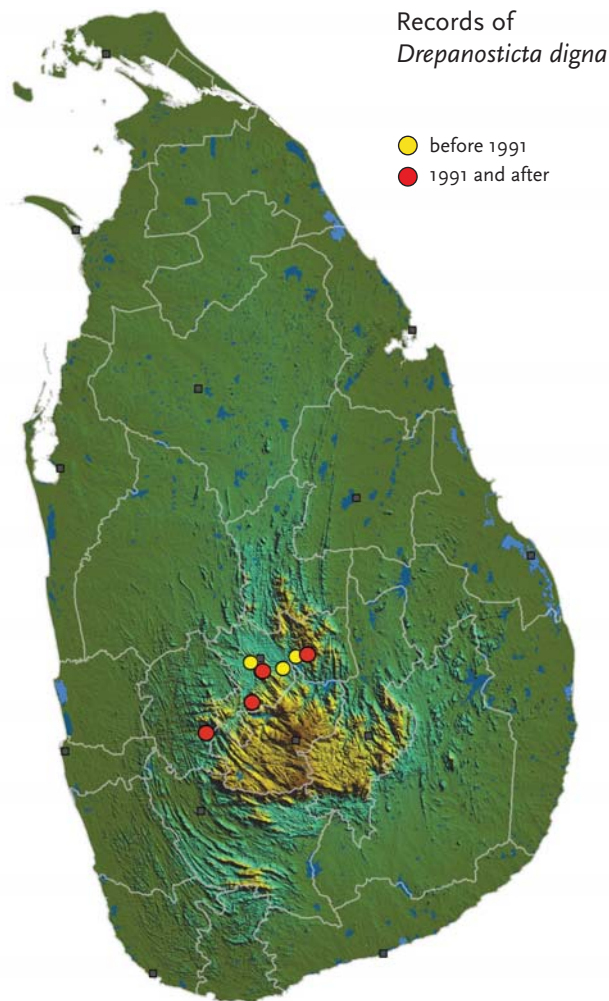
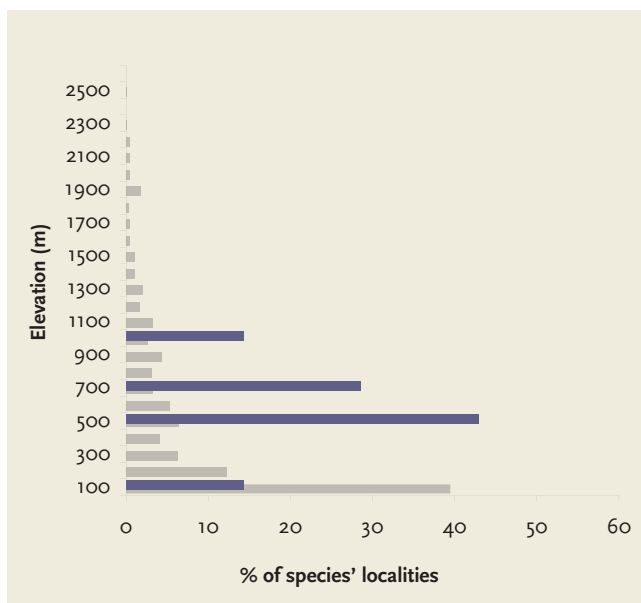
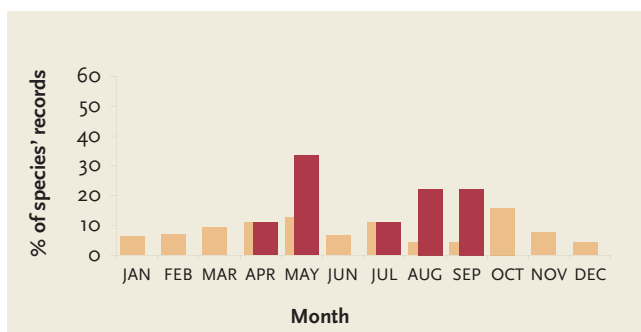
Since recent field experience with *D. digna* is extremely scarce, the vividly written account of F. C. Fraser (FRASER, 1933b) is germane. In May 1932 he re-discovered the species east of Kandy at Urugalla.



The 80 year-old field note reads like an exciting novel and is still full of valuable information “...I found this extremely beautiful insect in rather dry scrub in the bed of the river near Urugalla. The scrub was overshadowed by larger trees but occasional shafts of sunlight filtered through and dappled the undergrowth. Specimens of *Ceylonosticta digna* were to be seen resting on leaves or twigs in the spots of sunlight, very conspicuous although small, by reason of their strongly contrasted bright colours against the dark surroundings. By crawling about on my hands and knees beneath the dense thorny undergrowth, I managed to secure nearly thirty specimens, males being preponderant...”. The same locality was visited some years later in September 1938 by M. A. Lieftinck, who found the species in abundance and also observed emergence of both sexes from the main stream.

Consequently, Urugalla has been visited in different seasons at least four times in the past few years but surprisingly, the initially supposed quite numerous *D. digna*, turned out to be *D. austeni*. Only a single female of the former was found in May 2009 at a forested stream two kilometres from the original locality. The reasons for this state are unknown—range shifts of both species, adverse effects of changes in agricultural use of the surroundings or the strong seasonality of the species might be theoretical reasons for the intriguingly changed picture after 75 years.

Destruction of its habitat by deforestation as well as water extraction and pollution are the main threats affecting *D. digna*, therefore it is undoubtedly a globally threatened species. It is already declared as a nationally Critically Endangered species (VAN DER POORTEN & CONNIFF, 2012), while on the global level it should be listed among Endangered species according to the IUCN criteria.



| | |
|-----------------------------|---------------|
| Number of all localities: 6 | after 1990: 4 |
| Number of all records: 9 | after 1990: 4 |

| | |
|-----------------------------|---------------------|
| Extent of Occurrence (EOO): | 390 km ² |
| Area of Occupancy (AOO): | 28 km ² |

% of records per period:



IUCN Red List Criteria: EN B1ab(ii,iii)+2ab(ii,iii)

IUCN Red List Category: ENDANGERED

References & Synonymy:

Platysticta digna, Selys, 1860, Bull. Acad. r. Belg. (2)10: 440.

Platysticta digna - SELYS (1860a): 12; SELYS (1860b): 440; SELYS (1886): 151; KIRBY (1890): 132-133; KIRBY (1894): 562; LAIDLAW (1915): 387; *Drepanosticta digna* - LAIDLAW (1924): 361-362, fig. 9; LIEFTINCK (1940): 81, 88-89; LIEFTINCK (1955): 70; FERNANDO (1964): 190; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1984): 105; TSUDA (1986): 1, 213; FERNANDO (1990): 186; TOL (1992): 83; BRIDGES (1994): VII.68; BEDJANIĆ (1998): 9, 28, 59, 63, 67, 76; DE FONSEKA (2000): 12, 59, 60-62, 65, 207, 283, fig. B43; IUCN SRI LANKA (2000): 25; BEDJANIĆ (2004): 283, 287; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2007): 16; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 6; *Ceylonosticta digna* - FRASER (1931b): 333-334, pl. I, figs. 8&9; FRASER (1933a): 128, 134-136, fig. 63; FRASER (1933b): 204, 218-220, fig. 11;

Faunistic records: APPENDIX 2, page 296;

Drepanosticta hilaris (Hagen, 1860)

Merry Shadowdamsel

ENDEMIC

Quite different from the previous two species, the moderately-sized *Drepanosticta hilaris* is not so brightly coloured but still strikingly beautiful. The blue colouration is limited to the dorsum of the tip of the abdomen only, while the other basal abdominal markings and the lateral thoracic stripe are lightly ochreous, changing into a lighter shade of golden yellow ventrally on the thorax and on the middle lobe of the prothorax, beautifully contrasting with the bronzed black dorsum of the thorax and head.

Although formally and fully described by H. A. Hagen in 1860 (HAGEN *in* SELYS, 1860b) based on material from Rambodde, *D. hilaris* was actually the first Shadowdamsel reported from the island in the earliest odonatological accounts on the dragonflies of Sri Lanka, first as *Agrion hilare* (HAGEN, 1858) and subsequently as *Disparoneura hilaris* (HAGEN, 1859).

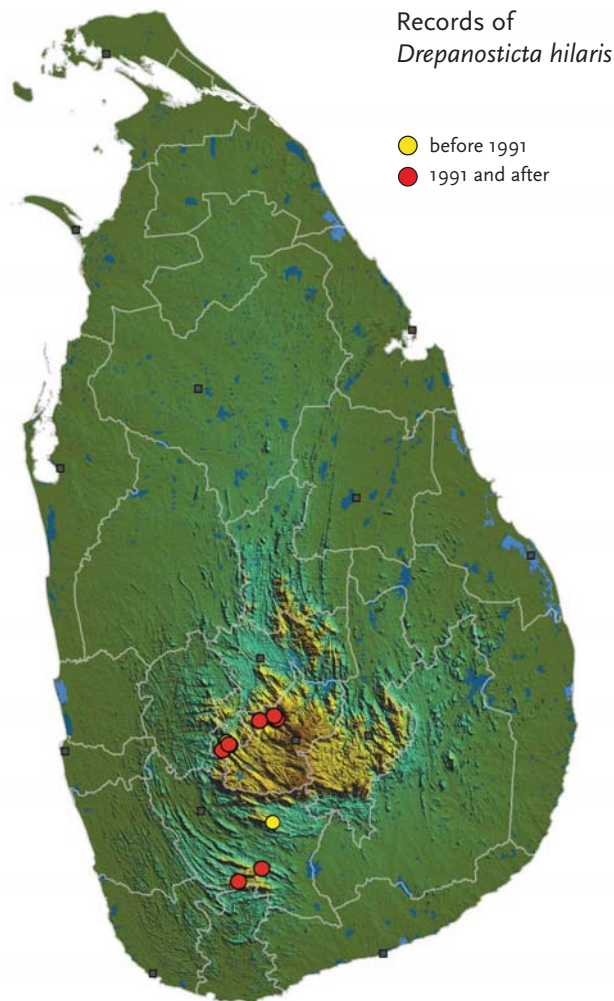
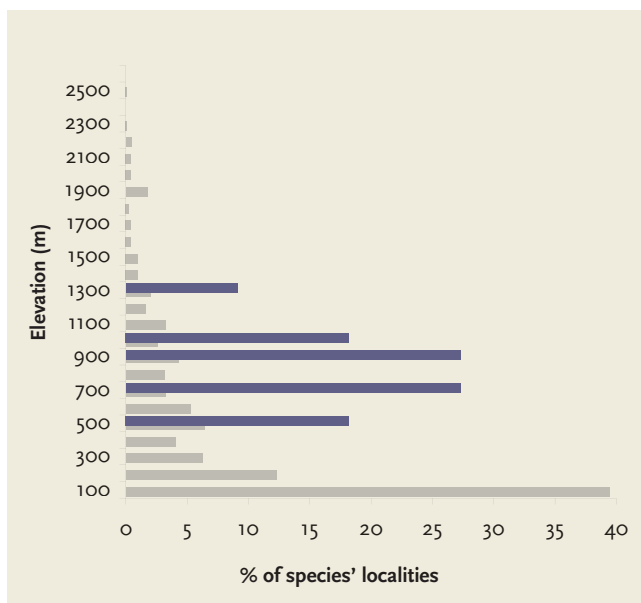
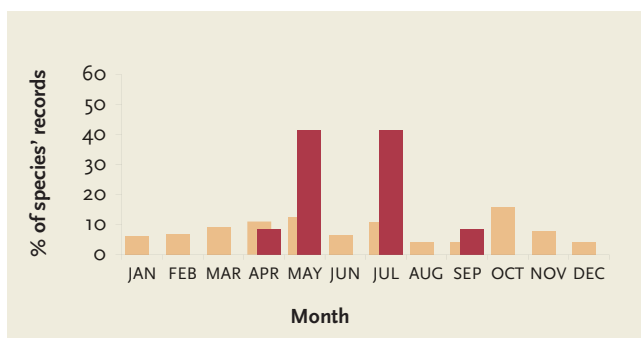
Apart from this historical record, there was very little published or unpublished information on the species' distribution. In May 1932, F. C. Fraser collected a single female at Rambodde and a single male at Balangoda (FRASER, 1933b). An additional two males of *D. hilaris*, collected near Laxapana in September 1970 by Oliver S. Flint, are known from the collection of the Smithsonian Institution. If an old record of an originally undetermined *Drepanosticta* from Kandy (LAIDLAW, 1924), quoted later without solid proof by FRASER (1931) and DE FONSEKA (2000) as pertaining to *D. hilaris*, is neglected, this is a complete summary of everything that was known about the species until the break of the millennium. However, the recent records are far from numerous. In May 2003, Matjaž Bedjanič found it in Sinharaja. In July 2009 and 2010 it was found by different observers near Norton Bridge. Karen Conniff recorded it in May 2010 near Laxapana and Rakwana and lastly, M. Bedjanič found it in the course of the



fieldwork supported by the Rufford Foundation at three localities around Rambodde and Pundaluoya in July 2012.

D. hilaris occurs in small colonies widely scattered in the hills of southwestern Sri Lanka, at altitudes between 500 and 1,300 metres. It is difficult to spot. Usually, it is observed hanging still from a leaf or twig in a well shaded forested vicinity of small streams, seeps or waterfalls. Nowadays, in the hilly regions of the island such habitats are increasingly rare and fragmented, surrounded by tea, rubber and alochtonous forest plantations, while the water of its habitat is extracted for domestic use or used for laundry, car and body washing at the spot.

The species was listed as threatened on the global and national level and declared as Critically Endangered by BEDJANIČ (2006a; 2009b) and VAN DER POORTEN & CONNIFF (2012). Based on the newly available data, its global IUCN ranking is proposed to be reduced to Endangered, with the caveat that so far none of the threats to its future long term survival have been eliminated or even mitigated.



| | |
|------------------------------|---------------|
| Number of all localities: 11 | after 1990: 8 |
| Number of all records: 12 | after 1990: 8 |

| |
|---|
| Extent of Occurrence (EOO): 1,191 km ² |
| Area of Occupancy (AOO): 36 km ² |

% of records per period:



IUCN Red List Criteria: EN B1ab(ii,iii)+2ab(ii,iii)

IUCN Red List Category: ENDANGERED

References & Synonymy:

Platysticta hilaris, Hagen in Selys, 1860, Bull. Acad. r. Belg. (2)10: 438.

Agrion hilare - HAGEN (1858): 479; TENNENT (1859): 282; TENNENT (1861): 454; MOTSCHULSKY (1863): 8; *Disparoneura hilaris* - HAGEN (1859): 207; *Platysticta hilaris* - SELYS (1860a): 11&12; SELYS (1860b): 438; SELYS (1886): 152; KIRBY (1890): 132; KIRBY (1894): 545, 562; LAIDLAW (1915): 387; *Drepanosticta hilaris* - LAIDLAW (1924): 362; LIEFTINCK (1955): 72; FERNANDO (1964): 190; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1984): 106; TSUDA (1986): 2, 213; FERNANDO (1990): 186; VAN TOL (1992): 119; BRIDGES (1994): VII.108; BEDJANIĆ (1998): 9, 28, 59, 63, 67, 76; DE FONSEKA (2000): 12, 59, 64-65, 207, 283, fig. B45; IUCN SRI LANKA (2000): 25; BEDJANIĆ (2004): 283, 287, 289; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23, 25; BEDJANIĆ et al. (2007): 16; IUCN SRI LANKA & MOENR (2007): 46; BEDJANIĆ (2009b): www.iucnredlist.org; VAN TOL (2009): 9; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 6; *Ceylonosticta hilaris* - FRASER (1931a): 67, fig 2b; FRASER (1931b): 326, 329, 330-331, pl. II, figs. 5&6; FRASER (1933a): 128-130, fig. 60; FRASER (1933b): 201, 204, 216-217, fig. 9;

Faunistic records: APPENDIX 2, page 296;

Drepanosticta lankanensis (Fraser, 1931)

Drooping Shadowdamsel

ENDEMIC

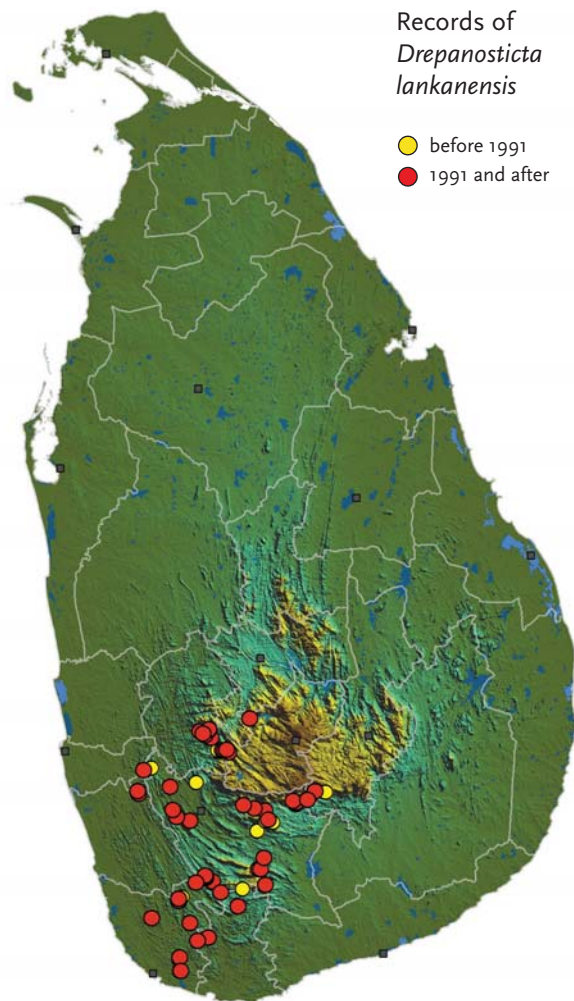
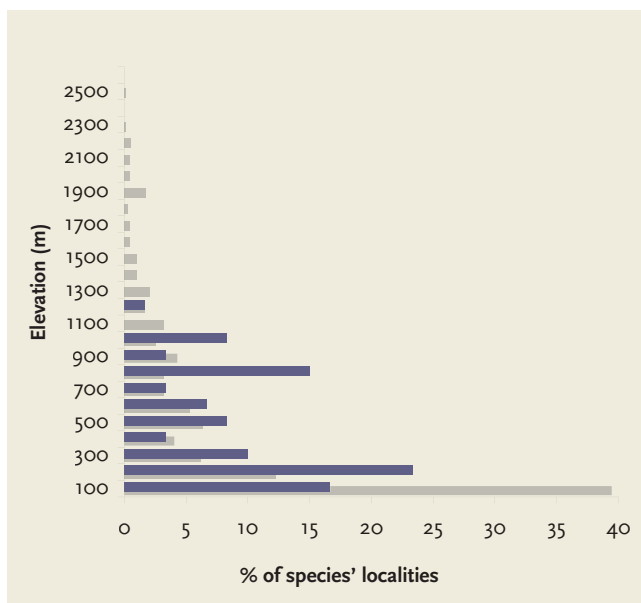
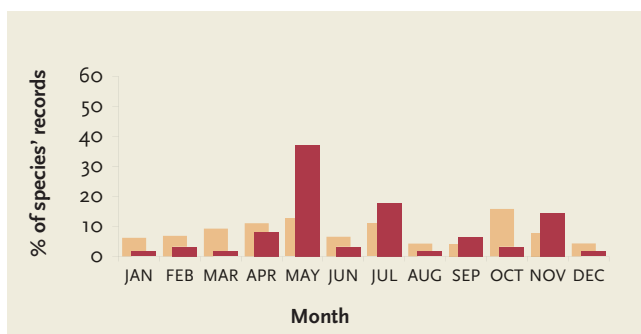
The title of the commonest Shadowdamsel of Sri Lanka goes to *Drepanosticta lankanensis*. This fact and the tendency for the species to develop very dark colouration in fully mature individuals caused quite a lot of taxonomic confusion and misled D. St. Quentin and M. A. Lieftinck into describing it under different names, only recently recognized to be synonyms. In a quite cursory description, the former named the species as *D. starmuehlneri* (ST. QUENTIN, 1972), shown to be incorrect by BEDJANIČ (2009a). Also a very detailed description of the enigmatic *D. sinhalensis* by M. A. Lieftinck (LIEFTINCK, 1971a), turned out to be in fact a very dark coloured *D. lankanensis* (BEDJANIČ, 2012b).

D. lankanensis belongs to the medium-sized Shadowdamsels. Its ground colouring is different shades of brown in young individuals, darker on the dorsum of the thorax and abdomen and turning yellowish towards the ventral side of the thorax. The head is black, the thorax bears sky blue stripes on the sides, while the abdomen is decorated with light bluish or ochreous apical rings on each segment and the last three segments are marked with azure blue on the dorsum. Adults become very dark brown to almost black with age and in this charming outfit the blue markings, especially of the females, are accentuated in all its beauty. Structurally, the easiest way to separate *D. lankanensis* from its congeners is the characteristic shape of the prothorax, with a swollen bilobate posterior portion of the anterior lobe, separated from the rounded tubercles of the pronotum by a deep sulcus, and by the gently inwardly curved inferior anal appendages of the male which have a marked basal spine and an abruptly upcurved tip.



The species occurs from the lowlands up to the mid-hills in habitats characteristic for the genus and it can often be found in the company of other *Drepanosticta* species. It has been found in all months, with apparent peaks in May, July and November largely related to the Platystictidae-oriented fieldwork in the last few years.

D. lankanensis seems to have the widest ecological tolerance of all its endemic congeners and can obviously survive also in disturbed landscapes and habitats. Although its distribution is limited to the southwestern part of the island, it is quite common here and new records are expected to follow in the future. Based on a limited dataset, VAN DER POORTEN & CONNIFF (2012) listed *D. lankanensis* as a Critically Endangered species in the recently published National Red List. Luckily, at least from the global perspective, it is not threatened with extinction yet. Therefore, *D. lankanensis* is currently ranked as a species of Least Concern according to the IUCN criteria.



| | |
|------------------------------|----------------|
| Number of all localities: 61 | after 1990: 48 |
| Number of all records: 69 | after 1990: 53 |

| |
|---|
| Extent of Occurrence (EOO): 5,305 km ² |
| Area of Occupancy (AOO): 184 km ² |

% of records per period:

1850-1920 1921-1990 1991-2013

7 16 77

IUCN Red List Criteria: NOT APPLICABLE

IUCN Red List Category: LEAST CONCERN

References & Synonymy:

Ceylonosticta lankanensis, Fraser, 1931, J. Bombay Nat. His. Soc. 35: 335, pl. II, figs. 11-12.

? *Platysticta montana* - Kirby (1894): 562; *Ceylonosticta lankanensis* - Fraser (1931b): 330, 335, pl. II-figs 11&12; Fraser (1933a): 128, 138-139, fig. 65; Fraser (1933b): 204, 218, 220-222, fig.12; *Drepanosticta lankanensis* - LIEFTINCK (1955): 72; FERNANDO (1964): 190; KIMMINS (1966): 200; LIEFTINCK (1971a): 190, 206; DAVIES & TOBIN (1984): 106; TSUDA (1986): 2, 213; FERNANDO (1990): 186; VAN TOL (1992): 163; BRIDGES (1994): VII.130; BEDJANIĆ (1998): 9, 28-29, 59, 63, 67, 76; DE FONSEKA (2000): 12, 63-64, 70, 207, 283, fig. B46; IUCN SRI LANKA (2000): 25; DE SILVA WIJAYERATNE et al. (2003): pl. 3; BEDJANIĆ (2004): 283, 287; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2006): pl. 7; BEDJANIĆ et al. (2007): 16, 88-89; WCSG (2008): 15; WCSG (2009): 14; BEDJANIĆ (2010): 211, 212; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 6; *Drepanosticta sinhalensis* - LIEFTINCK (1971a): 191-192, 206, fig. 1; LIEFTINCK (1971b): 130; FERNANDO (1974): 66; DAVIES & TOBIN (1984): 106; GEIJSKES & KIAUTA (1984): 36; TSUDA (1986): 2, 213; FERNANDO (1990): 260; VAN TOL (1992): 208; BRIDGES (1994): VII.219; DE FONSEKA (2000): 12, 66-67, 207, fig. B49; IUCN SRI LANKA (2000): 25; BEDJANIĆ (2004): 283, 287; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2007): 16; *Drepanosticta cf. sinhalensis* - BEDJANIĆ et al. (2007): 94-95; *Drepanosticta starmühlneri* - St. QUENTIN (1972): 137-139, fig. 1-3; *Drepanosticta starmühlneri* - DAVIES & TOBIN (1984): 106; TSUDA (1986): 2, 213; BRIDGES (1994): VII.223; BEDJANIĆ (2004): 283, 287; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2007): 16; *Drepanosticta starmühlneri* (sic!) - DE FONSEKA (2000): 12, 68, 207, fig. B50; IUCN SRI LANKA (2000): 25;

Drepanosticta lankanensis [syn. *Drepanosticta starmühlneri* St. Quentin, 1972] BEDJANIĆ (2009a): 38-39; *Drepanosticta lankanensis* [syn. *Drepanosticta sinhalensis* LIEFTINCK, 1971] – BEDJANIĆ (2012b): 77-78;

Drepanosticta mojca Bedjanič, 2010

Mojca's Shadowdamsel

ENDEMIC

Overall the quite similar general appearance of the Shadowdamsels often conceals the exceptional species diversity and variation in minute morphological structures. As regards the latter, *Drepanosticta mojca* is remarkable due to the almost totally reduced inferior anal appendages of the male. Also the male's last tergite is curiously distally prolonged, all of which is unknown in other species of Platystictidae, except for the undescribed *Drepanosticta* sp. nov. A, introduced later. In both sexes of *D. mojca*, the anterior lobe of the prothorax holds a pair of long stalked processes, similar to two other described species from Sri Lanka, viz. *D. tropica* and *D. subtropica*. However, the dark brown prothorax and processes, the brown sides of the thorax, with sky-blue thoracic stripes as well as the shape of the male's anal appendages are useful distinguishing characters of *D. mojca*.

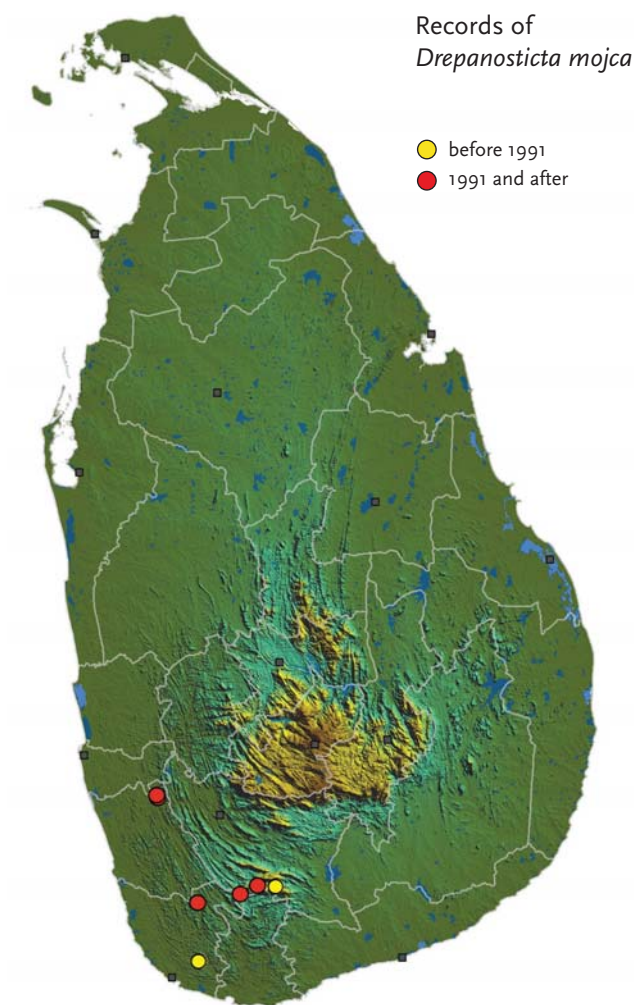
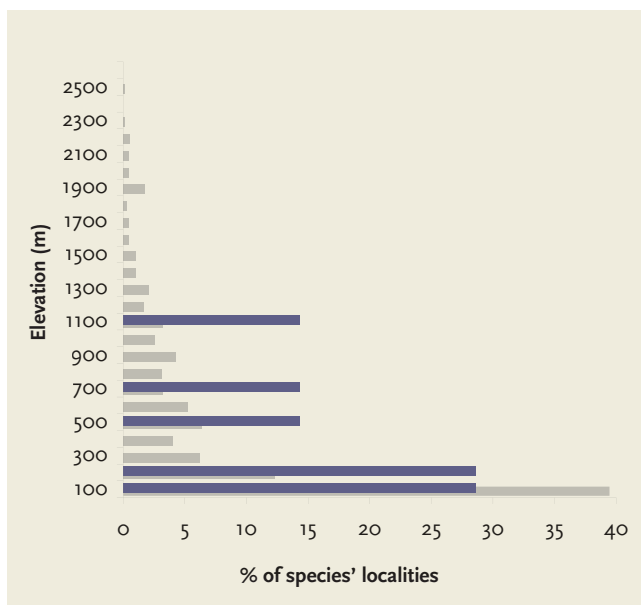
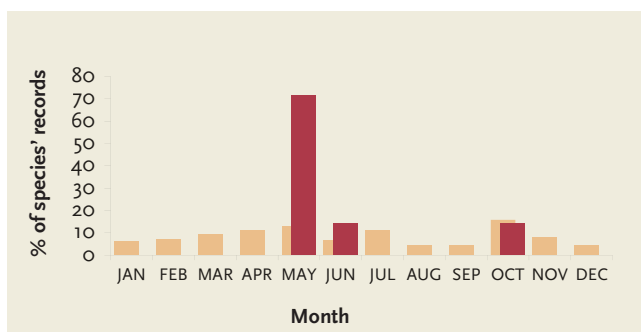
In the field, *D. mojca* is not easy to spot and determination without inspecting the specimen in the hand is even harder so this may partly be a reason behind the great paucity of records. So far it is known only from widely scattered and isolated localities—Bodhinagala, southern parts of Sinharaja near Deniyaya and from the Haycock Hill area, while older records originate from Enselwatte and the Kottawa Forest Reserve (BEDJANIČ, 2010). Surprisingly, no new localities have been discovered since the species' description and it was not found



during the course of Platystictidae-oriented fieldwork undertaken by Matjaž Bedjanič in 2012.

Individuals of *D. mojca* were observed dwelling some metres away from streams, in shady and dark undergrowth below the higher canopy, usually perching motionless on leaves and twigs at knee height. Along a small stream in the Haycock area flowing through a narrow forest corridor surrounded by sparsely cultivated tea plantations, several males were observed in the company of *D. lankanensis* and *D. bine*. As regards currently known phenology, it flies in May and June as well as in October.

D. mojca can be assessed as a very rare and insufficiently known species. Due to isolation of its populations and continued destruction of appropriate rainforest habitats in southwestern Sri Lanka, it is listed among globally threatened endemic dragonflies of Sri Lanka and assessed as an Endangered species according to IUCN Red List criteria.



Number of all localities: 6 after 1990: 4

Number of all records: 7 after 1990: 5

Extent of Occurrence (EOO): 1,507 km²

Area of Occupancy (AOO): 24 km²

% of records per period:

1850-1920 1921-1990 1991-2013

29

71

IUCN Red List Criteria: EN B1ab(ii,iii)+2ab(ii,iii)

IUCN Red List Category: ENDANGERED

References & Synonymy:

Drepanosticta mojca, Bedjanič, 2010, *Odonatologica* 39(3): 185, 186-190, 198-203, figs. 1-5, 16-18, 23.

Drepanosticta sp. nov. B – BEDJANIČ (2004): 287; BEDJANIČ (2006b) in BAMBARADENIYA (2006): 23; *Drepanosticta mojca* – BEDJANIČ (2010): 185, 186-190, 198-203, figs. 1-5, 16-18, 23; BEDJANIČ et al. (2011): 5, 44; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 1, 7;

Faunistic records: APPENDIX 2, page 296;

Drepanosticta montana (Hagen, 1860)

Dark Knob-tipped Shadowdamsel

ENDEMIC

More than 150 years ago, H. A. Hagen was quite right when he chose the specific Latin name of *Platysticta montana* (HAGEN in SELYS, 1860b), literally depicting the montane character of this mysterious endemic damselfly. Confirmation of that, however, became available only in the past few years, with the encouraging re-discovery of *Drepanosticta montana* after several decades.

D. montana is a charming moderately-sized Shadowdamsel, closely related to *D. submontana*, sharing with it a small chocolate brown patch on the vertex and occiput, obtuse tubercles on the superior anal appendages of males and clearly defined light blue thoracic stripes on the side of the thorax. However, *D. montana* is characterized by the following differences: the labrum is not bordered with black, the posterior and ventral sides of the thorax are yellowish, tubercles on the male's superior anal appendages are more pronounced and the apical stems of the inferior appendages end in a sickle-shaped upwardly and inwardly directed hook. The blue marking at the tip of the abdomen can apparently vary considerably in some populations.

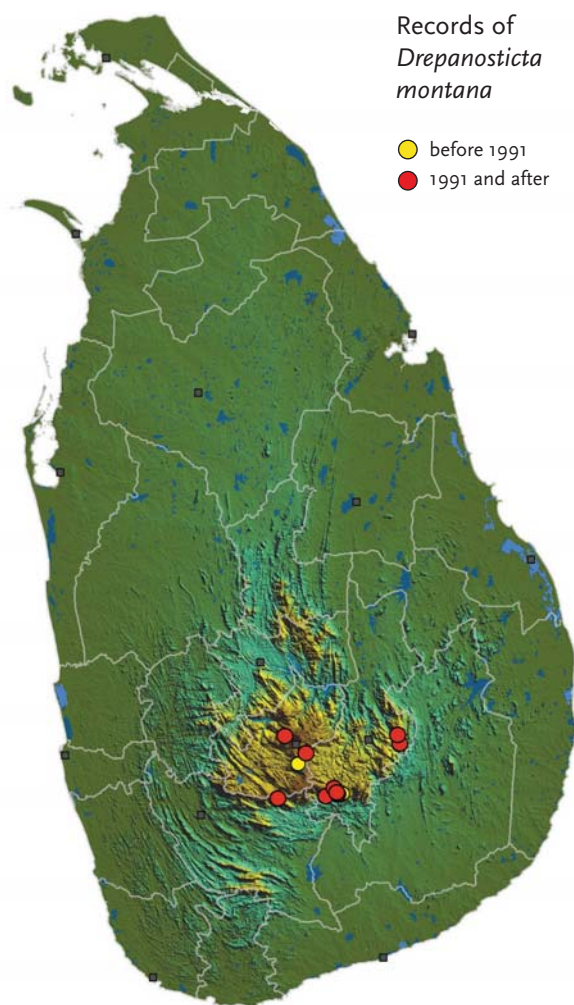
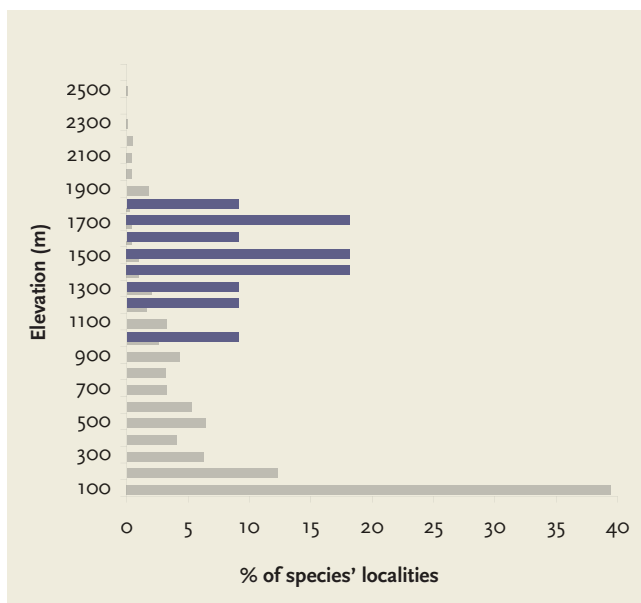
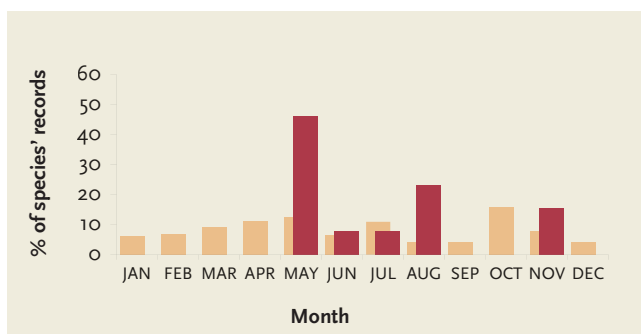
For years almost nothing was known on the distribution of *D. montana*, with only a single published detailed locality reported many decades ago by FRASER (1933b) from the vicinity of Haputale. In May 2009, Matjaž Bedjanič and Sampath Gunasinghe re-discovered the species in Tangemale Bird Sanctuary near Haputale and it has been also found in a small stream above the Haputale-Boralanda road and along small streams above the Hakgala Botanic Gardens. In August 2009, M. Bedjanič observed it again in Tangemale and at two additional localities northeast of Passara. In May 2010, Karen Conniff photographed the species near Haldummulla. In July and November 2012, M. Bedjanič recorded it at three new localities in the surroundings of Haputale, Bogawantalawa and Nuwara Eliya in the course of the fieldwork supported



by the Rufford Foundation. As a last addition, a previously undetermined male of *D. montana*, collected in June 1976 at Kande Ella near Nuwara Eliya has been discovered among the loaned Platystictidae material from the collection of the Smithsonian Institution.

D. montana is found at higher altitudes, from 1,000–2,000 metres, in the hills and mountains of central Sri Lanka. Here it inhabits small brooks and seeps in the remaining pockets of montane forest with tree ferns and small streams with still preserved corridors of natural montane vegetation. The majority of the known localities are isolated in the vast desert of tea plantations, vegetable fields, alochthonous forest plantations or clear-cut grassy slopes.

Due to habitat fragmentation and destruction, *D. montana* was declared as a Critically Endangered species, both on the global and national level (BEDJANIČ, 2006a; VAN DER POORTEN & CONNIFF, 2012). Exclusively based on the newly available data which broadens the known range of the species, its IUCN ranking is proposed to be changed to Endangered. Threats to its future survival, unfortunately, still remain the same in kind and intensity.



| | |
|------------------------------|----------------|
| Number of all localities: 11 | after 1990: 9 |
| Number of all records: 14 | after 1990: 11 |

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|---|
| Extent of Occurrence (EOO): 1,065 km ² |
| Area of Occupancy (AOO): 40 km ² |

% of records per period:

1850-1920 1921-1990 1991-2013

| | | |
|---|----|----|
| 7 | 14 | 79 |
|---|----|----|

IUCN Red List Criteria: EN B1ab(ii,iii)+2ab(ii,iii)

IUCN Red List Category: ENDANGERED

References & Synonymy:

Platysticta montana, Hagen in Selys, 1860, Bull. Acad. r. Belg. (2)10: 438.

Platysticta montana - SELYS (1860a): 10-11; SELYS (1860b): 438; SELYS (1886): 151; KIRBY (1890): 132; LAIDLAW (1915): 387; *Drepanosticta montana* - LAIDLAW (1924): 362; LIEFTINCK (1955): 72; FERNANDO (1964): 190; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1984): 106; TSUDA (1986): 2, 213; FERNANDO (1990): 186; VAN TOL (1992): 159; BRIDGES (1994): VII.158; BEDJANIĆ (1998): 9, 29, 59, 63, 67, 76; DE FONSEKA (2000): 12, 58-60, 207, 283, fig. B47; IUCN SRI LANKA (2000): 25; BEDJANIĆ (2004): 283, 287, 289; BEDJANIĆ (2006a): www.iucnredlist.org; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23, 25; BEDJANIĆ et al. (2007): 16; WCSG (2008): 15; BEDJANIĆ (2010): 200, 202, 210; DE SILVA WIJAYERATNE (2012b) in PETHIYAGODA (2012): 186; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 6; *Ceylonosticta montana* - FRASER (1931b): 330, 331-332pl. I, fig. 11; FRASER (1933a): 128, 130-132, fig. 61; FRASER (1933b): 203, 213-214, fig. 7;

Faunistic records: APPENDIX 2, page 296;

Drepanosticta nietneri (Fraser, 1931)

Nietner's Shadowdamsel

ENDEMIC

The last of the small Shadowdamsels described above, the delicate *Drepanosticta nietneri* is characterised by its rusty to dark brown ground colour and azure blue markings. Described by FRASER (1931b) based on material collected by Col. F. Wall in October 1924 at Kandy, the species honours the odonatologically very important name of John Nietner, a German by birth, gardener and coffee plantation owner in Sri Lanka, but also enthusiastic botanist, entomologist and collector. In the middle of the 19th century, J. Nietner laid the foundations of odonatological research in Sri Lanka by passionately collecting in the surroundings of Rambodde and sending much material to the renowned odonatologist H. A. Hagen in Europe for his groundwork accounts of the island's dragonfly fauna (HAGEN, 1858; 1859).

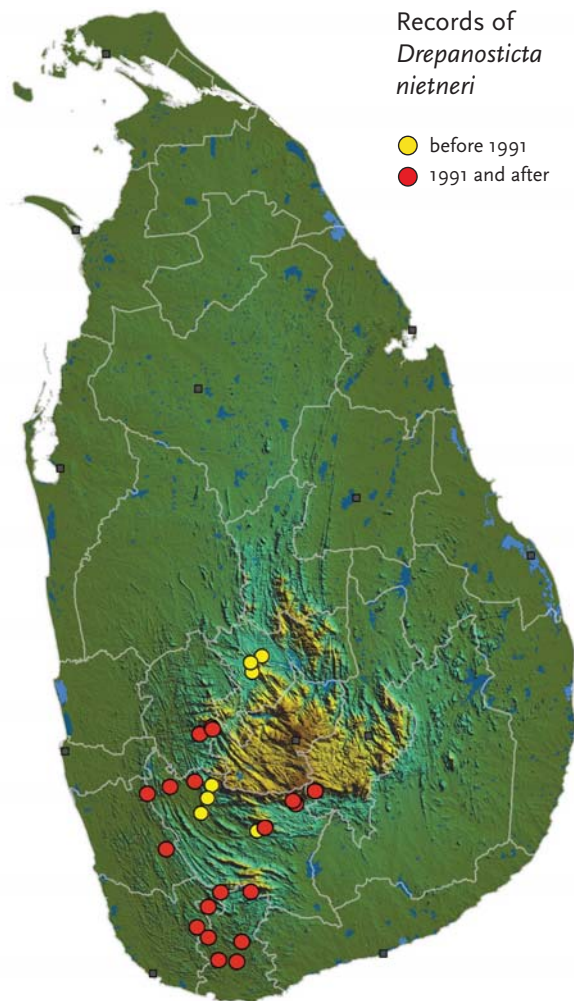
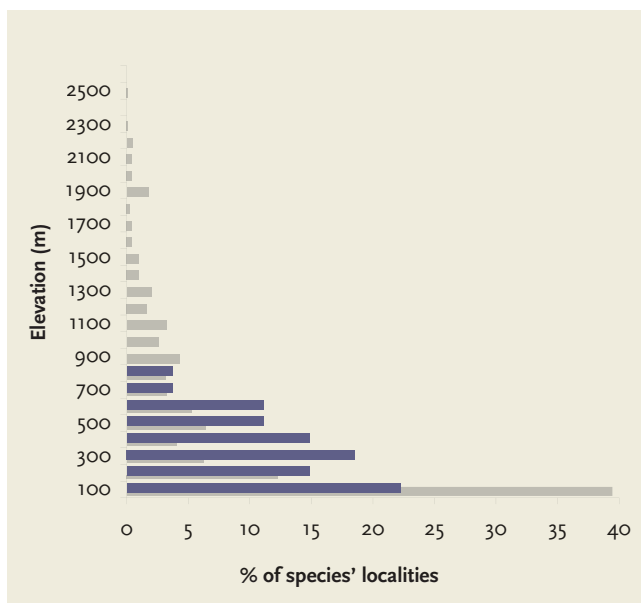
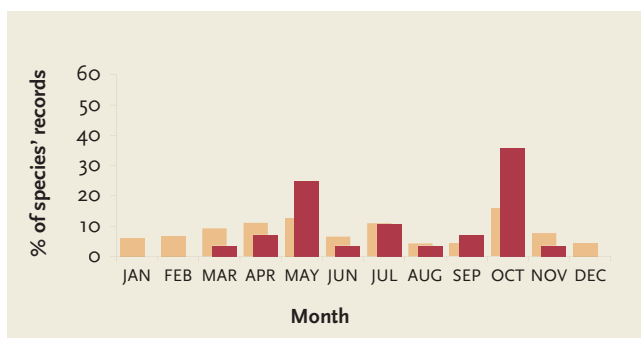
D. nietneri is characterised by a dorsally black head, attractive light blue eyes above and below that are traversed around the middle by a broad brown stripe, a light blue prothorax and well-defined blue mid-dorsal and lateral stripe on a rusty brown thorax and azure blue markings on a dark brown abdomen. The males are distinguished from all related species by the clubbed sub-trilobate apex of the inferior appendages, which cursorily resemble a duck's foot and are of almost the same length as the superiors. Differing from *D. digna*, the females have a more restricted dorsal blue colouring on the prothorax, the posterior border of which is simple and rounded, and narrower basal blue abdominal annules.

The distribution of the species comprises the lowlands and mid-hills in the southwestern and central part of the island with the exception of the central hills and roughly extending from Kandy in



the north, Belihuloya in the east, Hiyare in the south and Ingiriya in the west. In between, its distribution is very scattered. However, it is quite common in the remaining rainforests at Sinharaja, Kanneliya and Kithulgala, and locations such as Bopathella Falls near Ratnapura where it was found to be very common in May. Its flight season extends from March to November, with apparent peaks in May and October.

Compared to the other Sri Lankan Shadowdamsels, *D. nietneri* has a rather broad range, but still, its known and potential habitats are already fragmented and areas of occupancy are very small. As for many of its congeners, the odds for its future long-term survival are affected mainly by continuing habitat loss. Based on a less complete dataset, VAN DER POORTEN & CONNIFF (2012) rated it as Critically Endangered in the National Red List. The present assessment also lists it as threatened on the global level and ranks it in the category of Vulnerable species according to the IUCN criteria.



Number of all localities: **28** after 1990: **19**

Number of all records: **33** after 1990: **21**

Extent of Occurrence (EOO): **5,319 km²**

Area of Occupancy (AOO): **108 km²**

% of records per period:

1850-1920 1921-1990 1991-2013

36

64

IUCN Red List Criteria: **VU B1ab(ii,iii)+2ab(ii,iii)**

IUCN Red List Category: **VULNERABLE**

References & Synonymy:

Ceylonosticta nietneri, Fraser, 1931, J. Bombay Nat. His. Soc. 35: 334-335, pl. II, figs. 7-8.

Ceylonosticta nietneri - FRASER (1931b): 330, 334-335, pl. II, figs. 7&8; FRASER (1933a): 128, 136-137, fig. 64; FRASER (1933b): 204, 217-218, fig. 10; *Drepanosticta nietneri* - LIEFTINCK (1955): 72-73; FERNANDO (1964): 190; KIMMINS (1966): 206; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1984): 106; TSUDA (1986): 2, 213; FERNANDO (1990): 186; VAN TOL (1992): 163; BRIDGES (1994): VII.164; BEDJANIĆ (1998): 9, 29, 59, 63, 67, 76; DE FONSEKA (2000): 12, 61-62, 70, 207, 283, figs. B48a-c; IUCN SRI LANKA (2000): 25; DE SILVA WIJeyeratne et al. (2003): pl. 3; BEDJANIĆ (2004): 283, 287; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2006): pl. 7; BEDJANIĆ et al. (2007): 16, 92-93; WCSG (2008): 15; WCSG (2009): 14; VAN TOL (2009): 29, 30-31, 37, 39, 42, 49, 62-62, 66-67, 69-70, figs. 48, 55; BEDJANIĆ (2010): 209; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 6;

Faunistic records: APPENDIX 2, page 297;

Drepanosticta submontana (Fraser, 1933)

Bordered Knob-tipped Shadowdamsel

ENDEMIC

Only recently was the shroud of mystery around the enigmatic *Drepanosticta submontana* resolved. Namely, there had been very few new records since its first description from Kandy, and only in the last year, was it shown that *D. fraseri*, described by LIEFTINCK (1955), was conspecific with the earlier described *D. submontana* (BEDJANIČ, 2012b).

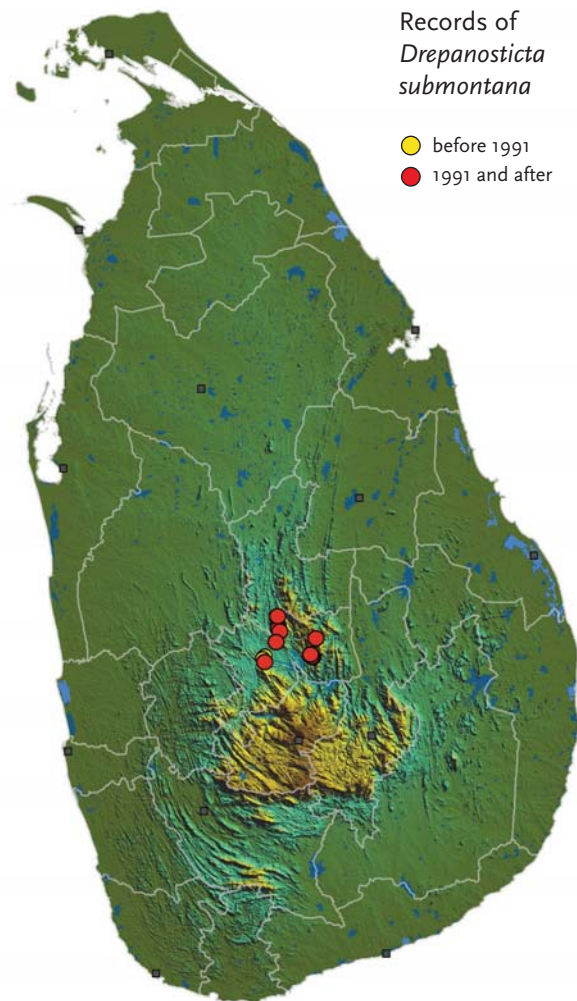
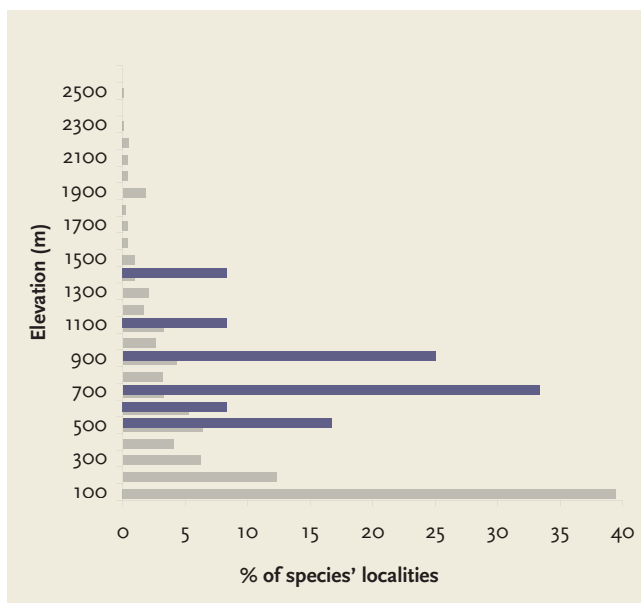
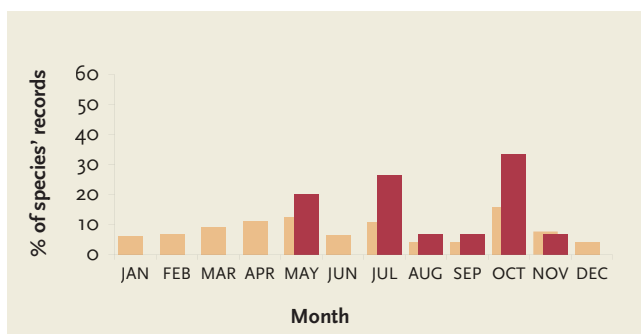
Still, the species belongs to the least known of the Sri Lankan Shadowdamsels. Only a few records from only two localities were known prior to the break of the millennium. The records from Kandy were based on material collected by Col. F. Wall in July 1910 and September 1924 (FRASER, 1933b; collection of the NHM London). An additional two records, from Deiyannewela above Kandy, were based on individuals identified as *D. fraseri* and collected by Swiss dipterologist F. Kaiser in October and November 1953 (LIEFTINCK, 1955; BEDJANIČ, 2012b). The species was rediscovered only in October 2001 by Matjaž Bedjanič and Ali Šalamun northeast of Kandy in a small stream near Wattegama. Nancy van der Poorten recorded it in May 2007 at Corbet's Gap in the Knuckles, and Karen Conniff in October 2008 at Hunas Falls, while in May, July, August and October 2009 it was found by M. Bedjanič and K. Conniff at a few localities in the western and eastern outskirts of the Knuckles and near Kandy. The last known observation, made in July 2012 in the course of the Rufford Foundation-supported fieldwork, comes from Urugalla.

D. submontana is closely related to *D. montana*. The main differences between the two taxa include black bordering of the labrum, a smaller tubercle on the superior anal appendages and a simple finger-shaped



apical process on the inferior anal appendages of *D. submontana*. This rather large species is distinguished from other congeners by the dark brownish patch on the occiput and vertex of the head and by the rounded postmedian tubercle on the superior anal appendages of the males. Otherwise its body is dark chocolate brown with a distinct lateral blue stripe, light ochreous basal annules on the abdominal segments, except for the variably marked eighth and the last two segments, which are blue.

Since its currently known range is very small and limited only to the heavily populated submontane areas around Kandy and a few streams in the parts of the Knuckles that are already largely converted into tea plantations, it is clear that *D. submontana* unfortunately belongs to the list of globally endangered species. While BEDJANIČ (2006) and VAN DER POORTEN & CONNIFF (2012) listed it as Critically Endangered on the global and national level respectively, based on a more comprehensive dataset, it is assessed as Endangered in the present publication.



| | |
|------------------------------|----------------|
| Number of all localities: 12 | after 1990: 10 |
| Number of all records: 14 | after 1990: 10 |

| | |
|-----------------------------|---------------------|
| Extent of Occurrence (EOO): | 285 km ² |
| Area of Occupancy (AOO): | 36 km ² |

% of records per period:



IUCN Red List Criteria: EN B1ab(ii,iii)+2ab(ii,iii)

IUCN Red List Category: ENDANGERED

References & Synonymy:

Ceylonosticta submontana, Fraser 1933, Ceylon J. Sci. (B) 17(3): 203, 214-216, fig. 8.

Ceylonosticta submontana - FRASER (1933b): 203, 214-216, fig. 8; *Drepanosticta submontana* - LIEFTINCK (1955): 73; FERNANDO (1964): 190; KIMMINS (1966): 215; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1984): 106; TSUDA (1986): 2, 213; FERNANDO (1990): 186; VAN TOL (1992): 215; BRIDGES (1994): VII.226; BEDJANIĆ (1998): 9, 30, 59, 63-63, 67, 76; DE FONSEKA (2000): 12, 59-60, 207, fig. B51; IUCN SRI LANKA (2000): 25; BEDJANIĆ (2004): 283, 287, 289; IUCN SRI LANKA & MOENR (2007): 46; BEDJANIĆ (2010): 200, 202, 210; VAN DER POORTEN & CONNIF (2012) in MOE (2012): 6; *Drepanosticta fraseri* - LIEFTINCK (1955): 70-72, fig. 1; FERNANDO (1964): 190; LIEFTINCK (1971a): 206; LIEFTINCK (1971b): 125; DAVIES & TOBIN (1984): 105; GEIJSKES & KIAUTA (1984): 36; TSUDA (1986): 2, 213; FERNANDO (1990): 186; VAN TOL (1992): 107; BRIDGES (1994): VII.92; BEDJANIĆ (1998): 9, 30, 59, 63, 67, 76; DE FONSEKA (2000): 12, 67-68, 207, fig. B44; IUCN SRI LANKA (2000): 25; BEDJANIĆ (2004): 283, 287; BEDJANIĆ (2006a): www.iucnredlist.org; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23, 25; BEDJANIĆ et al. (2007): 16; BEDJANIĆ (2010): 200, 202, 210; *Drepanosticta submontana* [syn. *Disparoneura fraseri* Lieftinck] - BEDJANIĆ (2012b): 77-78;

Faunistic records: APPENDIX 2, page 297;

Drepanosticta subtropica (Fraser, 1933)

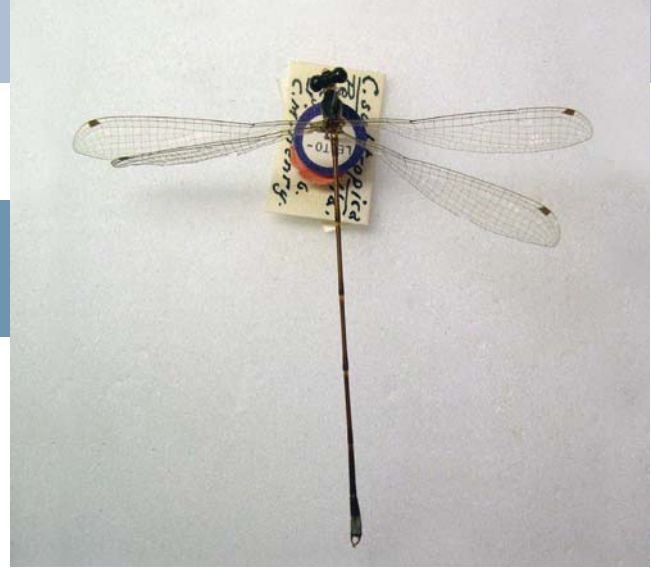
Blue-shouldered Cornuted Shadowdamsel

ENDEMIC

Despite all the work in the last few years devoted to finding the mysterious endemic Platystictidae of Sri Lanka, success has not been complete. The eagerly expected re-discovery of *Drepanosticta subtropica*, which remained the last unsolved enigma, was not to be, unfortunately also bearing with it fears of the species' extinction.

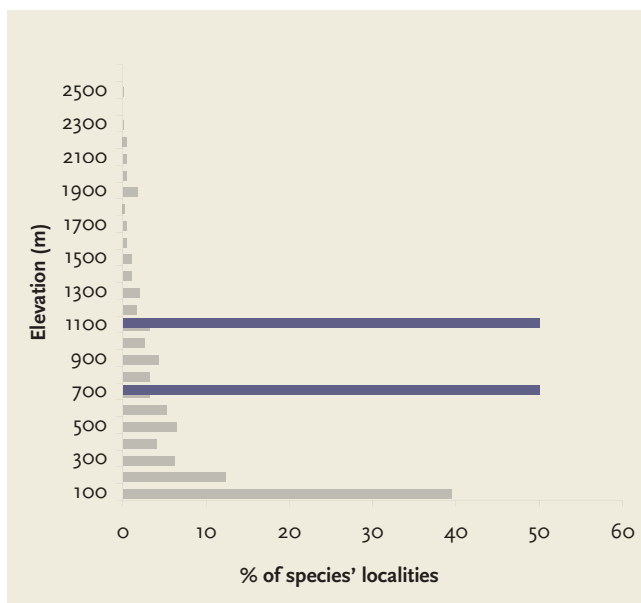
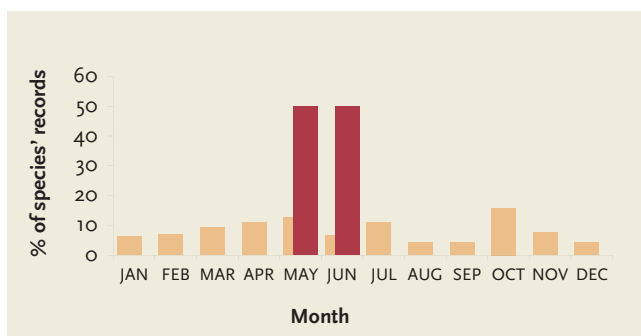
D. subtropica was described by F. C. Fraser in his groundwork publication *The Platystictas of Ceylon* (FRASER, 1933b). He described both sexes, giving "Balangoda and Pettiagalla, Ceylon, during May and June" as the only note on their type locality. According to KIMMINS (1966), the material was actually collected on 21 June 1926 by Mr. G. M. Henry, the Assistant in Systematic Entomology at the Colombo Museum. The type male and female, housed in the collection of the Natural History Museum in London appear to be the only known specimens to date.

The species is closely related to *D. tropica* with which it shares the curious stalked clubbed processes on the anterior lobe of the prothorax, as well as a yellowish metepimeron and yellowish portions of the ventral thorax posterior to the light bluish lateral stripe. *D. subtropica* is characterized by the following: the labrum narrowly bordered with glossy black, the middle lobe of the prothorax pale blue and the posterior lobe a dark chocolate brown, and inferior anal appendages hair-thin (FRASER, 1933b). Another two species, *D. mojca* and *Drepanosticta* sp. nov. A, also have peculiar prothorax projections, that are however longer, especially in the latter species. The metepimeron and rest of the thorax are brown and the males have the tergite of the last abdominal segment posteriorly prolonged and totally reduced inferior anal appendages.



After searching unsuccessfully for *D. subtropica* in the last few years, it was one of the target species of the fieldwork carried out by Matjaž Bedjanič in 2012 under the support of the Rufford Foundation. The surroundings of Balangoda and the nearby Pettiagalla Estate were visited in July and November but despite finding a surprising number of seven representatives of the family along the streams in the remaining corridors of natural vegetation among Pettiagalla tea plantations, there was no sight of *D. subtropica*. However, a last gleam of hope still remains since fieldwork has not been carried out comprehensively from April to October, which are the most suitable months for Shadowdamsels, and the hardly accessible remaining forests on the hilltops have not yet been surveyed.

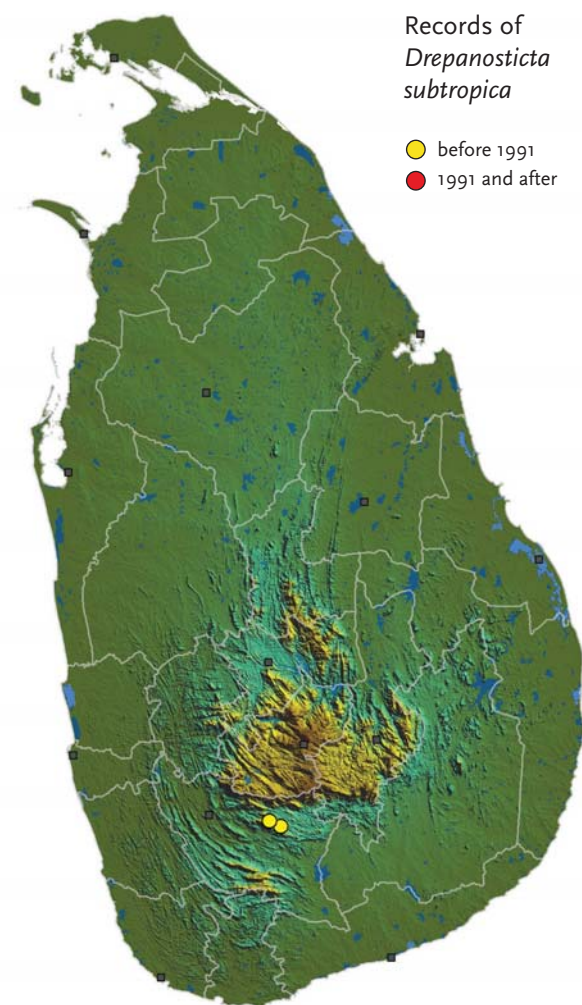
It goes without saying that more than eight decades ago the surroundings of Balangoda must have had a very different aspect. At present, the forests are cut almost to the hilltops, tea plantations still seem to expand and the population pressure together with changed land use and exploitation of the smallest water sources is very high. Therefore it is clear that the species is highly threatened on the global level. However, some potentially suitable habitats for *D. subtropica* still exist along the hill ridge above Pettiagalla and towards Uwella. These areas should be the target of future field surveys. Until the results of these surveys are at hand, it is "optimistically" ranked as Critically Endangered according to the IUCN criteria and it also has the same ranking in the National Red List (VAN DER POORTEN & CONNIFF, 2012).



| | |
|-----------------------------|---------------|
| Number of all localities: 2 | after 1990: 0 |
| Number of all records: 2 | after 1990: 0 |

% of records per period:

1850-1920 1921-1990 1991-2013



| | |
|-----------------------------|-------------------|
| Extent of Occurrence (EOO): | 8 km ² |
| Area of Occupancy (AOO): | 8 km ² |

IUCN Red List Criteria: CR B1ab(ii,iii)+2ab(ii,iii,iv)

IUCN Red List Category: CRITICALLY ENDANGERED

References & Synonymy:

Ceylonosticta subtropica, Fraser 1933, Ceylon J. Sci. (B) XVII(3): 203, 209-211, fig. 5;

Ceylonosticta tropica - FRASER (1931b): pl. I, figs. 1&2; *Ceylonosticta subtropica* - FRASER (1933b): 203, 209-211, fig. 5; KIMMINS (1966): 215; *Drepanosticta subtropica* - LIEFTINCK (1955): 73; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1984): 106; TSUDA (1986): 2, 213; VAN TOL (1992): 216; BRIDGES (1994): VII.227; BEDJANIĆ (1998): 9, 30, 59, 63, 67, 76; DE FONSEKA (2000): 12, 56-57, 207, 283, fig. B53; IUCN SRI LANKA (2000): 25; BEDJANIĆ (2004): 283, 287; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2007): 16; BEDJANIĆ (2010): 197, 209; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 7; *Drepanosticta sub-tropica* (sic!) - FERNANDO (1964): 190; FERNANDO (1990): 186;

Faunistic records: APPENDIX 2, page 297;

Drepanosticta tropica (Hagen, 1860)

Dark-shouldered Cornuted Shadowdamsel

ENDEMIC

The last Sri Lankan Shadowdamsel species with peculiar stalked prothorax processes is *Drepanosticta tropica*, described more than 150 years ago by H. A. Hagen (HAGEN in SELYS, 1860b).

D. tropica differs from its close relative *D. subtropica* by the labrum having only a pale brownish border, by the prothorax coloured reddish brown, without pale blue and by less markedly attenuated inferior anal appendages, which have a distinct upturned spine at their base and are pointed at their ends. Its prothorax processes are markedly shorter than the ones seen in *D. mojca* and *Drepanosticta* sp. nov. A, while in males the rudimentary inferior appendages of the latter two species will separate them at a glance.

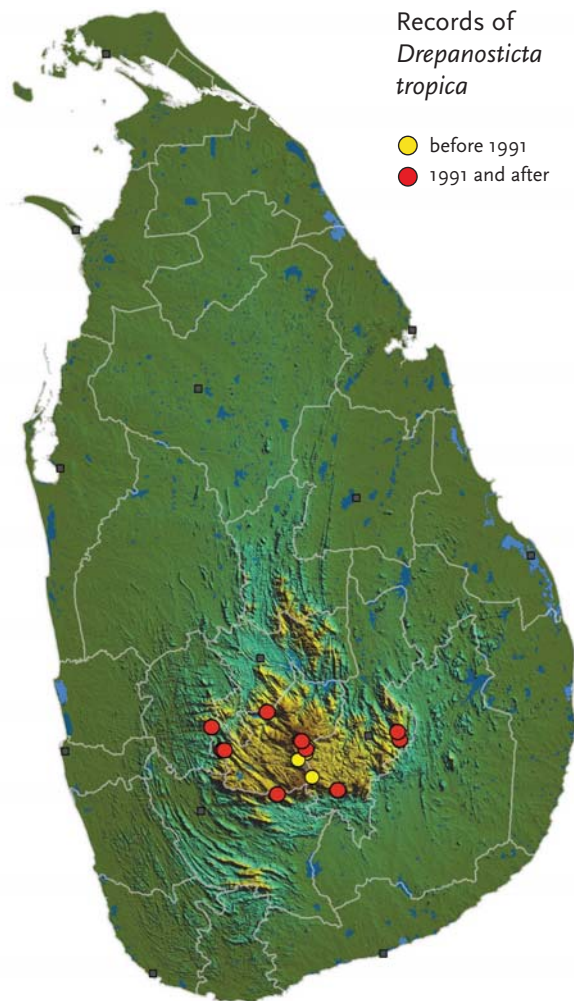
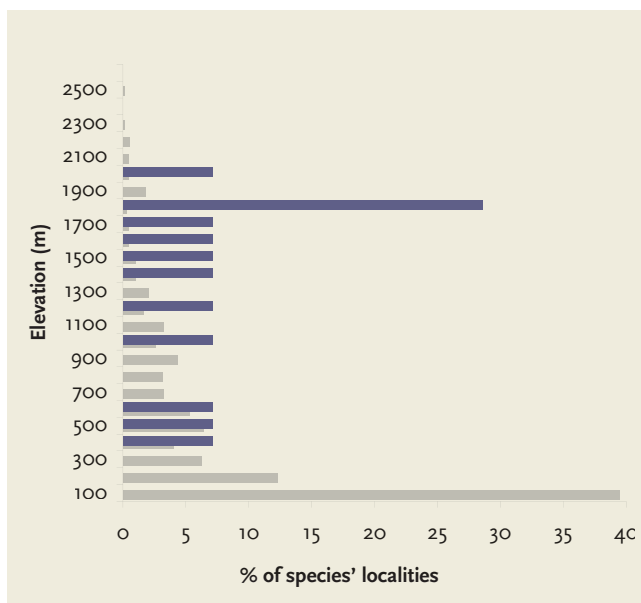
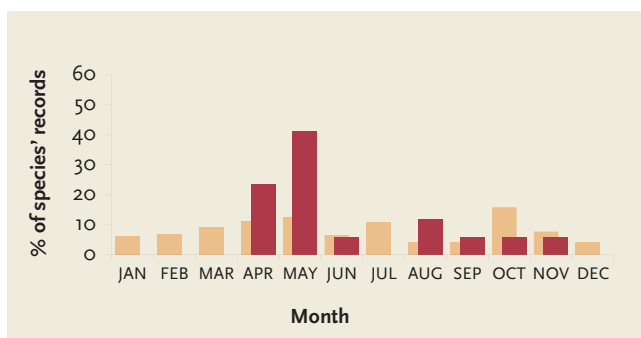
Older records from the literature are relatively scarce, reported as Passara and Hakgala (FRASER, 1931; 1933a), as Nuwara Eliya, Hakgala and the slopes of the surrounding hills (FRASER, 1933b), while LIEFTINCK (1955) listed the species from Hakgala again. An additional unpublished record by the researchers of the Smithsonian Institution comes from Kande Ella near Nuwara Eliya and DE FONSEKA (2000) adds an old record from Ohiya. Another location, Haycock Hill, is mentioned among the species' localities in FRASER (1931; 1933a). However, since it falls well outside of the currently known species' range and well into the range of the only recently described *D. mojca*, Haycock Hill is not included as a location for *D. tropica* anymore. If we skip ahead a half a century, the addition of new records is not very impressive. In April 2003, Matjaž Bedjanič found the species again in Hakgala, near Nuwara Eliya and at Malwatta Falls near Pussellewa. In May 2009, in the company of Sampath Gunasinghe, he observed the species at Hakgala and at Tangemale Sanctuary near Haputale (DE SILVA WIJEYERATNE, 2012) and he found it also at two localities northeast of Passara in August 2009. Karen Conniff recorded *D. tropica* at three



localities in the Kithulgala range in May and October 2010. The last record of M. Bedjanič was added from Bogawantalawa north of Balangoda in November 2012.

Clearly, the species prefers higher altitudes, although apparently it can also be found in the mid-hills. Small streams and seeps, densely overgrown with natural montane vegetation are the characteristic habitat of the species. The best months to observe it on the wing are April and May, though its flight season extends into November.

D. tropica shares the sombre destiny of the endangered endemic damselflies whose occurrence is predominantly limited to the mountains in the central part of Sri Lanka. Here, the landscape is largely changed and converted into shiny green tea plantations, beautifully maintained vegetable gardens, exemplary planted pine or eucalyptus forests that largely lack pristine montane habitats. Only in tiny remnants of those natural habitats will small populations of the species be able to survive, but its future long-term prospects are not bright. Therefore, the species is assessed as globally threatened and on the IUCN scale ranked in the Endangered category.



Number of all localities: **14** after 1990: **10**

Number of all records: **17** after 1990: **12**

Extent of Occurrence (EOO): **1,872 km²**

Area of Occupancy (AOO): **48 km²**

% of records per period:

1850-1920 1921-1990 1991-2013

29

71

IUCN Red List Criteria: **EN B1ab(ii,iii)+2ab(ii,iii)**

IUCN Red List Category: **ENDANGERED**

References & Synonymy:

Platysticta tropica, Hagen in Selys, 1860, Bull. Acad. r. Belg. (2) 10: 438.

Platysticta tropica - SELYS (1860a): 10; SELYS (1860b): 438; SELYS (1886): 151; KIRBY (1890): 132; KIRBY (1894): 562; KIRBY (1905): 272; LAIDLAW (1915): 387; LAIDLAW (1917b): 341; *Drepanosticta tropica* - LAIDLAW (1924): 362; LIEFTINCK (1955): 73; FERNANDO (1964): 190; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1984): 107; TSUDA (1986): 2, 213; FERNANDO (1990): 186; VAN TOL (1992): 227; BRIDGES (1994): VII.238; BEDJANIĆ (1998): 9, 30, 59, 63, 67, 76; DE FONSEKA (2000): 12, 56, 59, 207, 283, figs. B52a-c; IUCN SRI LANKA (2000): 25; DE SILVA WIJEYERATNE et al. (2003): pl. 3; BEDJANIĆ (2004): 283, 287; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2006): pl. 7; BEDJANIĆ et al. (2007): 16, 96-97; BEDJANIĆ (2010): 197, 209; DE SILVA WIJEYERATNE (2012b) in PETHIYAGODA (2012): 186; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 6; *Ceylonosticta tropica* - FRASER (1931b): 330, 332-333; FRASER (1933a): 128, 132-134, fig. 62; FRASER (1933b): 203, 207-209, figs. 3, 4;

Faunistic records: APPENDIX 2, page 297;

Drepanosticta walli (Fraser, 1931)

Wall's Shadowdamsel

ENDEMIC

The last on the long list of hereto named Sri Lankan Shadowdamsels is *Drepanosticta walli*. But if ordered from the point of view of beauty, the listing might well be reversed. This very dark brown, almost black species is so attractively decorated with contrasting sky-blue markings that it stands out even in the heavy rivalry of its congeners. *D. walli* was described by F. C. Fraser (FRASER, 1931b), who named it after its discoverer and his colleague from the Indian Medical Service, a well known ophiologist, Col. Frank Wall.

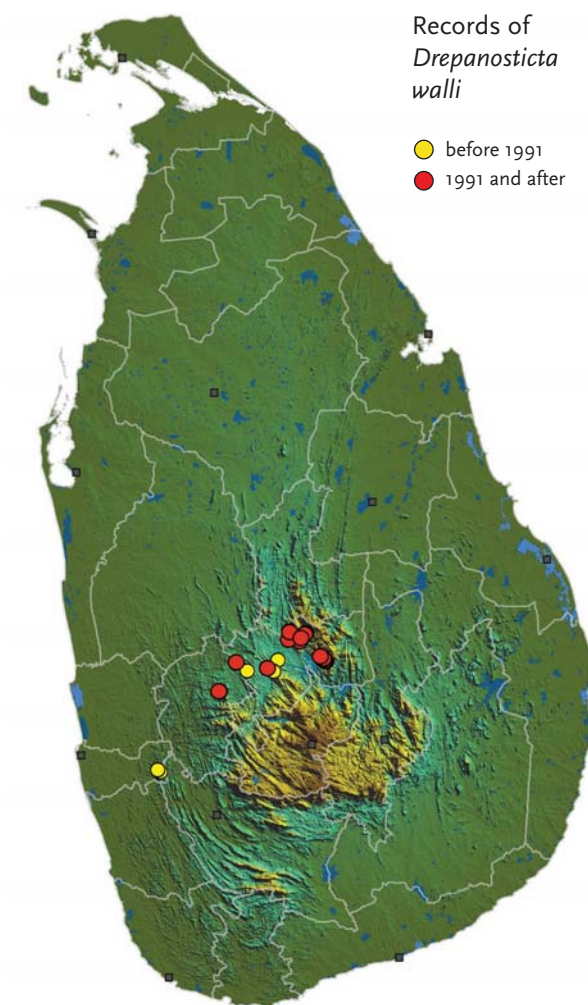
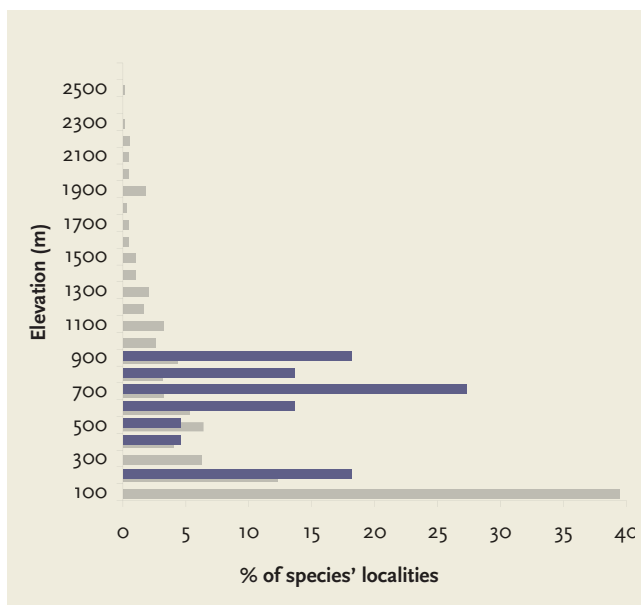
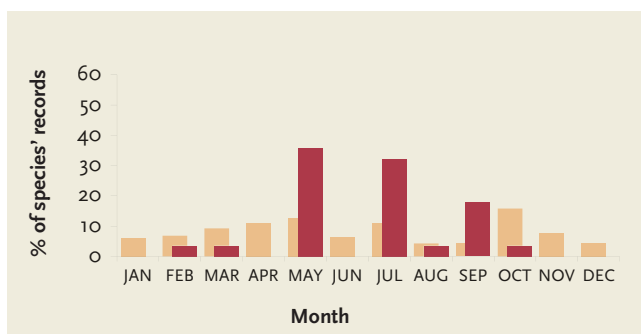
The species is closely related to *D. lankanensis* and is characterized by its very dark colours when fully mature, while younger individuals have a warm brownish tone. Both sexes have peculiar contrasting blue colouration of the middle lobe and a medially prolonged posterior lobe of the prothorax, a well-defined lateral blue thoracic stripe and blue markings along the abdomen and on its tip. The females have an additional blue triangular spot on the lower part of the dorsum of the thorax adjoining the coxae and beautifully sky blue basal annules in the middle abdominal segments. These markings are coloured light ochreous in males.

The distribution of *D. walli* is limited to the wider surroundings of Kandy and the Knuckles. Isolated western records originate from Tunmodera near Labugama and were obtained in the course of the Smithsonian Insect Project in September 1970 by Oliver S. Flint. In the last few years the species has not been found again in this region, but at least it has been found at new localities near Nilamalapala and Dabathgama, additionally confirming its occurrence west of Kandy. *D. walli* inhabits small seepages and brooklets meandering down the sides of the hills and can be found in dense jungle or



surrounding stream vegetation. As observed and remarked by FRASER (1933b), this peculiarly beautiful dark Shadowdamsel can be frequently seen hiding up in the curtains of gentle ferns hanging from the sides of small streams.

As for the whole genus, the habitats of *D. walli* are also under great pressure due to the destruction of natural forests and corridors of natural vegetation along streams, water pollution and extraction as well as other pressures on flowing waters in the wider Knuckles area and the surroundings of Kandy. This might be the justified reason of VAN DER POORTEN & CONNIFF (2012) in listing the species as Critically Endangered in the National Red List. On the global level, due to the lack of new knowledge, BEDJANIĆ (2009b) listed the species as Data Deficient only a few years ago. With the hereto accumulated data and field experience this obstacle is not so burning anymore and according to the IUCN criteria it is possible to assess the species as globally Endangered.



Number of all localities: **22** after 1990: **17**

Number of all records: **26** after 1990: **20**

Extent of Occurrence (EOO): **1,257 km²**

Area of Occupancy (AOO): **68 km²**

% of records per period:

1850-1920 1921-1990 1991-2013

23

77

IUCN Red List Criteria: **EN B1ab(ii,iii)+2ab(ii,iii)**

IUCN Red List Category: **ENDANGERED**

References & Synonymy:

Ceylonosticta walli, Fraser, 1931, J. Bombay Nat. His. Soc. 35: 335-336.

Ceylonosticta walli - FRASER (1931b): 330, 335-336; FRASER (1933a): 128, 139-140, fig. 66; FRASER (1933b): 204, 222-224, fig. 13; KIMMINS (1966): 218; *Drepanosticta walli* - LIEFTINCK (1955): 73; FERNANDO (1964): 190; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1984): 107; TSUDA (1986): 2, 213; FERNANDO (1990): 186; VAN TOL (1992): 234; BRIDGES (1994): VII.250; BEDJANIĆ (1998): 9, 30, 59, 63, 67, 76; DE FONSEKA (2000): 12, 61-63, 67, 208, 283, figs. B57a-c; IUCN SRI LANKA (2000): 25; BEDJANIĆ (2004): 283, 287; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23, 25; BEDJANIĆ et al. (2007): 16; BEDJANIĆ (2009b): www.iucnredlist.org; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 7;

Faunistic records: APPENDIX 2, page 298;

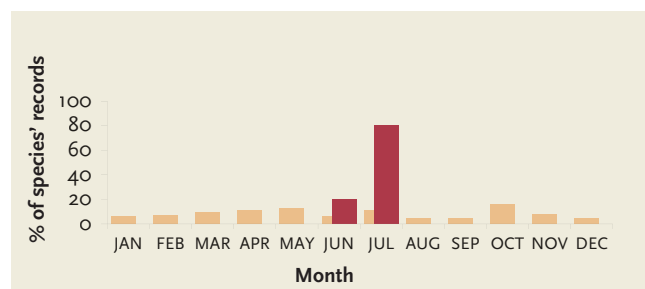
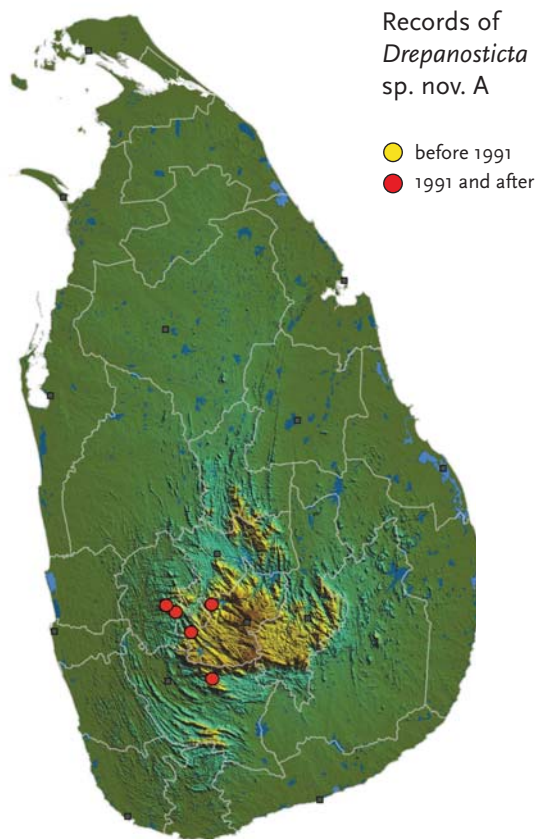
Drepanosticta sp. nov. A Bedjanič & Conniff, in prep.

ENDEMIC

A surprising record of an unknown Shadowdamsel appeared during fieldwork in the hill range extending from Kithulgala towards Norton Bridge in July 2009 while Karen Conniff and Matjaž Bedjanič were checking small streams along the road. It soon became clear that this curious *Drepanosticta* was new to science and that it appeared to be related to *D. mojca*, which was in the process of description at that time (BEDJANIČ, 2010).

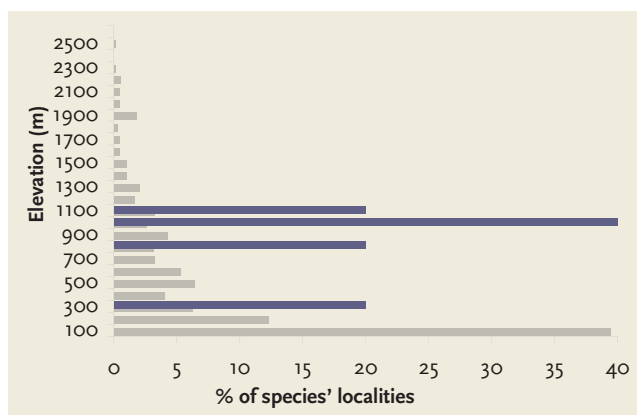
Since the present publication is not taxonomic by nature, this interesting new species will be described elsewhere and is only tentatively named as *Drepanosticta* sp. nov. A. It differs from all other described endemic Shadowdamsels of Sri Lanka by very long stalked processes on the anterior lobe of the prothorax, by whitish to pale bluish colouration of the prothorax and by totally reduced inferior anal appendages of males.

It is currently known from the surroundings of Kithulgala, Norton Bridge, Harangala and Weweltalawa. Preliminary examination showed that the southern population from the surroundings of Balangoda shows some distinct morphological characters and may even belong to another undescribed species.



Number of all localities: 5 after 1990: 5

Number of all records: 5 after 1990: 5





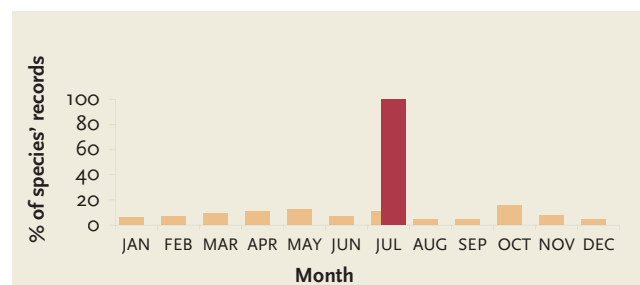
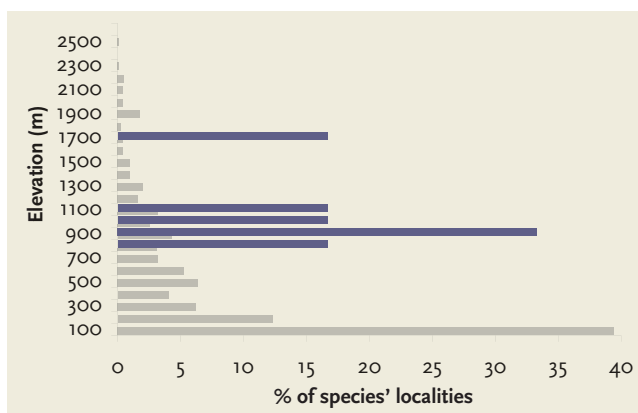
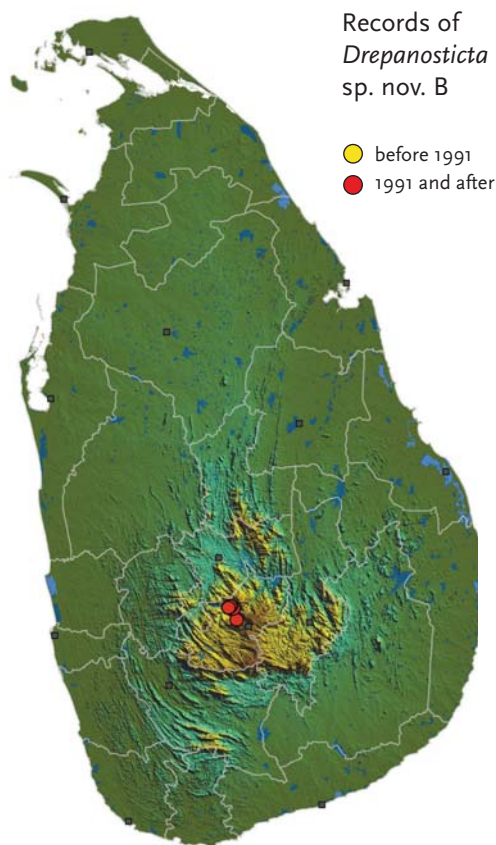
Drepanosticta sp. nov. B Bedjanič & Conniff, in prep.

ENDEMIC

The existence of this strikingly beautiful Shadow-damselfly became apparent only in the course of the fieldwork supported by the nature conservation grant of the Rufford Foundation. This undescribed *Drepanosticta* has been observed and photographed at few new localities in the wider surroundings of Rambodde.

It was first recorded by the researchers of the Smithsonian Institution in 1970 and has been hidden among undetermined Platystictidae material in their collection since that time. At first look it is similar to *D. brincki* by the blue prothorax and uniformly rusty brown dorsum of the thorax. However, it is larger, the posterior and ventral parts of the thorax are a golden-yellowish colour, the inferior anal appendages of the males have inwardly directed projections somewhat similar to *D. austeni* and *D. digna* and the apical sky blue marking is sharply limited to the last two abdominal segments.

It seems the species is very seasonal. It is located in highly fragmented habitats in the central part of the island and is exposed to several threats. It definitely deserves conservation attention together with the preceding undescribed congener.



Number of all localities: 6 after 1990: 6

Number of all records: 6 after 1990: 6

Platysticta apicalis Kirby, 1894

Dark Forestdamsel

ENDEMIC

Forestdamsels are large and not brightly coloured. However, when peacefully hanging from leaves and small branches or skilfully propelling their long wings and slender bodies through the shaded surroundings of small forest streams they exhibit both beauty and elegance.

They are also extremely interesting in phylogenetic and taxonomic terms. F. F. Laidlaw noted very early that the genus was exceedingly distinct and expressed a belief that it was related to the South American genus *Palaemnema*, suggesting that the Sri Lankan *Platysticta* species are surviving paleogenic remnants of an ancient fauna (LAIDLAW, 1924; 1951). Luckily, several decades later, also with the help of ongoing molecular studies, the phylogenetic relations and zoogeographic origin of the exclusively endemic Platystictidae of Sri Lanka are very close to being understood and explained.

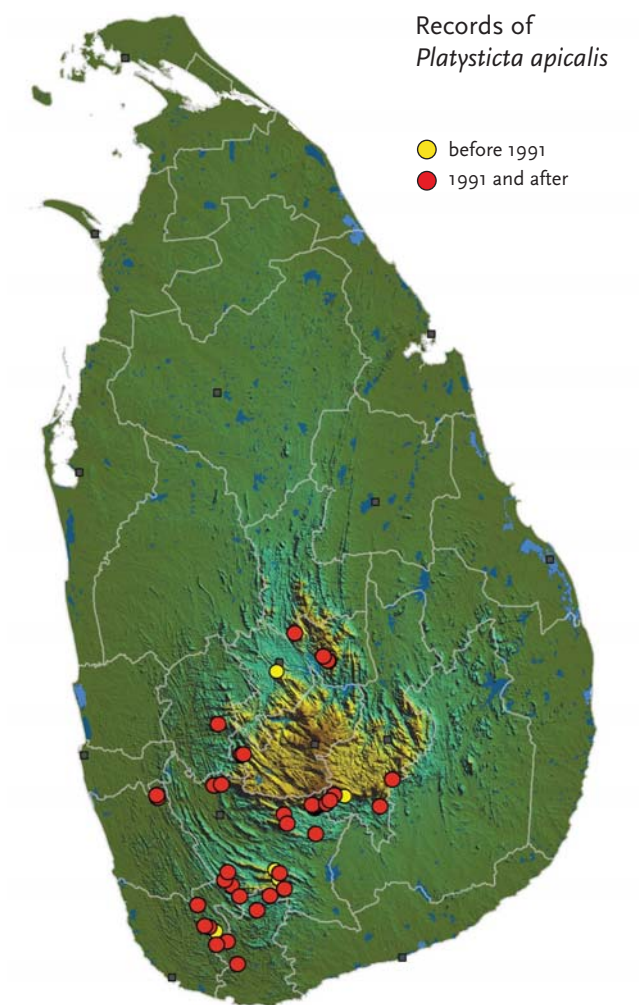
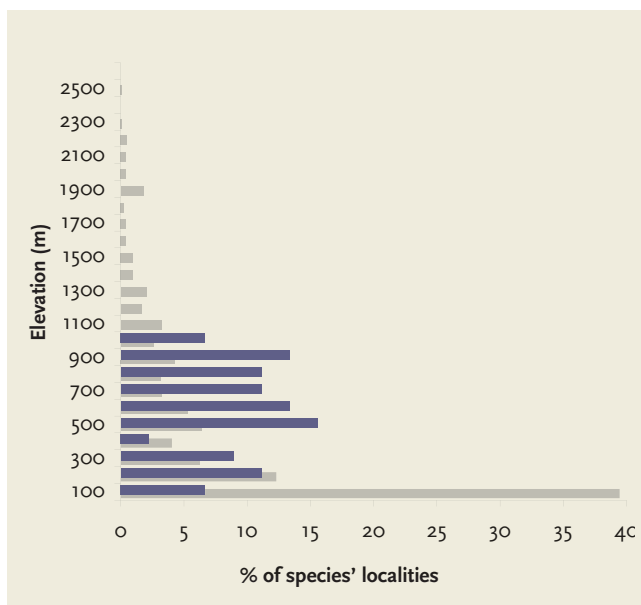
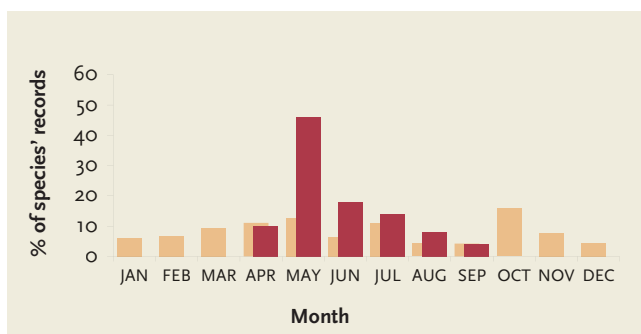
Platysticta apicalis was described and figured by W. F. Kirby, based on material collected in June 1892 at Belihul Oya by Col. J. W. Yerbury (KIRBY, 1894). The species is characterized by its considerable size and long wings, which in adult males have dark brown tipped apices. Its eyes are brownish black above and only narrowly light grayish below, the prothorax is whitish except for the black posterior lobe, with a deep sulcus between the anterior lobe and the middle lobe, which has an extensive, low and broadly rounded embossment on each side. The thorax is bronzed black, with contrasting light coloured lateral stripes as well as light posterior and ventral parts. In males, the last three abdominal segments are blue on the dorsum and their anal appendages are very peculiarly shaped. The tips of the superiors are curved downward behind the middle and dilated at the extremities; below there is a distinct small dorsal tubercle, while inferiors have a strong erect basal spine and a characteristic deep notch before its upturned point. Females are similar to their mates except for having clear wing tips slightly



enfumed yellowish and a black middorsal stripe on its sky blue dorsum at the ninth abdominal segment.

Although the species is quite easily distinguished from its congener *P. maculata*, F. C. Fraser confused it with two additional undescribed species and figured, described and combined a mix of different species together in his papers (FRASER, 1931b; 1933a; 1933b). Clearly, the majority of scarce older records needed to be checked in museum collections, but recent fieldwork brought a considerable amount of new information regarding the species' occurrence. It inhabits streams and rivulets in the remaining forested areas of the southwestern and central parts of the island, ranging from the lowlands to the mid-hills. It can be locally common and some of the best places and times to observe it occurs between April and September at Sinharaja, Kanneliya, Bodhinagala and the surroundings of Belihul Oya and Urugalla.

Although listed as Endangered in the National Red List (VAN DER POORTEN & CONNIFF, 2012), with a more complete dataset and under the global IUCN criteria, *P. apicalis* is for now assessed as a Near Threatened species.



| | |
|------------------------------|----------------|
| Number of all localities: 45 | after 1990: 37 |
| Number of all records: 54 | after 1990: 41 |

| |
|---|
| Extent of Occurrence (EOO): 7,912 km ² |
| Area of Occupancy (AOO): 148 km ² |

% of records per period:

| | | |
|-----------|-----------|-----------|
| 1850-1920 | 1921-1990 | 1991-2013 |
| 4 | 20 | 76 |

IUCN Red List Criteria: NOT APPLICABLE

IUCN Red List Category: NEAR THREATENED

References & Synonymy:

Platysticta apicalis, Kirby, 1894, J. linn. Soc. Lond., Zool. 24: 561-562, pl. XLII- fig.1.

Platysticta apicalis - KIRBY (1894): 561-562, pl. XLII-fig.1; LAIDLAW (1915): 387; LAIDLAW (1917b): 341; LAIDLAW (1924): 361; FRASER (1931b): 326, 327-328, pl I, fig. 6; FRASER (1933a): 121, 123-124, fig. 58; FRASER (1933b): 202-203, 206-207, 218, figs. 2a-b; LIEFTINCK (1955): 69-70; FERNANDO (1964): 190; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1984): 107; TSUDA (1986): 3, 213; FERNANDO (1990): 186; VAN TOL (1992): 36; BRIDGES (1994): VII.16; BEDJANIĆ (1998): 9, 30-31, 59, 63-64, 67, 76; DE FONSEKA (2000): 12, 69-70, 208, 283, figs. B56a-c, B57d; IUCN SRI LANKA (2000): 25; DE SILVA WIJEYERATNE et al. (2003): pl. 3; BEDJANIĆ (2004): 283, 287; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2006): pl. 8; BEDJANIĆ et al. (2007): 16; 98, 101; WCSG (2008): 15; WCSG (2009): 14; VAN TOL (2009): 30, 41, 64-65, 66-67, 69-70, figs. 48, 55; BEDJANIĆ (2010): 211; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 7;

Platysticta maculata Hagen, 1860

Blurry Forestdamself

ENDEMIC

Somewhat smaller in length than the preceding congener, but still of considerable size by common damselfly standards, *Platysticta maculata* stands out with its attractive velvet black colouring. It is tinted whitish or yellowish only on the ventral portion of the thorax, which also bears a weakly bluish or whitish lateral stripe. Males have an anteriorly rounded dorsal sky blue marking at the tip of the abdomen, while in their somewhat smaller and stouter mates this marking is variable but largely obscured by black on the dorsum.

P. maculata has an interesting taxonomic background. It was described by H. A. Hagen in 1860, based on material collected by J. Nietner at Rambodde (HAGEN, 1859; HAGEN in SELYS, 1860). Three decades later it was described as *P. greeni* by KIRBY (1891), who soon corrected this mistake (KIRBY, 1894). F. C. Fraser summarized the known records from Rambodde, Pundaluoya and Urugalla (FRASER, 1931b). However, in his later and otherwise excellent papers on the Sri Lankan Forest damselflies (FRASER, 1933a; 1933b), he mistook and combined the features of no less than three species under the name of *P. maculata*, two of which are still undescribed and will follow on the next pages. The main reason for this error was in neglecting the fact that Hagen and Kirby were correct in the original descriptions, stating that males of *P. maculata* have clear wing tips, dorsally bronzy black prothorax and tips of inferior anal appendages turned inwards at almost a right angle.

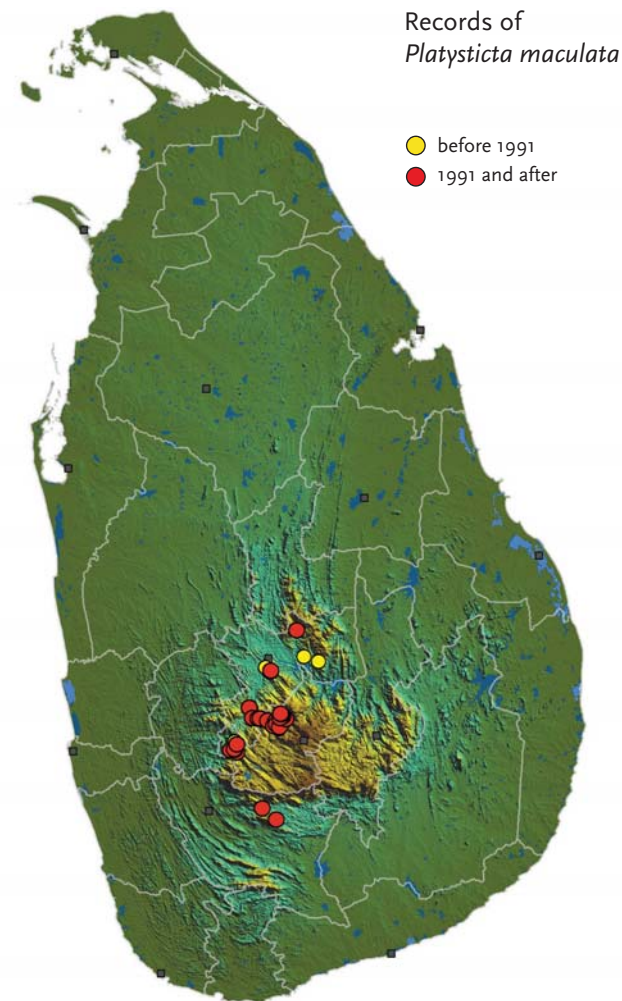
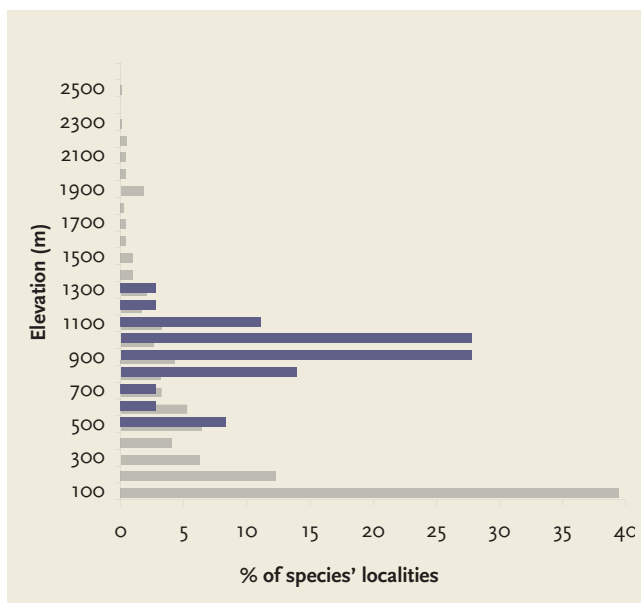
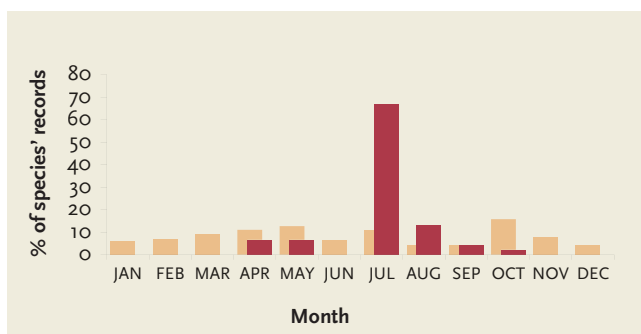
All this became clear only recently, with careful examination of museum collections and types in England, Belgium and the United States, and by examining unpublished original colour drawings of E. de Selys-Longschamps. But most important was the re-discovery of the true *P. maculata* in July 2009 by Karen Conniff and Matjaž Bedjanič, followed by several new records from the surroundings of



Laxapana, Norton Bridge and Kandy. In May, July and August 2010 the aforementioned records were confirmed once again by Karen Conniff and Nancy van der Poorten. In the course of the Rufford Foundation supported fieldwork in July 2012 carried out by M. Bedjanič, *P. maculata* was found to be relatively common around Pundaluoya and Rambodde and almost twenty additional localities have been brought to light, including from the vicinity of Balangoda to the south and from the Knuckles to the north.

In the central part of the island the species inhabits small streams with tiny waterfalls and is usually found by accessing and examining such habitats from the road cuts at the sides of the hills. Apparently, July is the best month to search for the species at the right places.

Treated under the name of *P. greeni* in VAN DER POORTEN & CONNIFF (2012) it was recently listed as Critically Endangered in the National Red List. Due to the heavily degraded landscapes in the central part of Sri Lanka and due to ongoing threats, *P. maculata* is threatened at the global level and assessed as a Vulnerable species according to the IUCN criteria.



| | |
|------------------------------|----------------|
| Number of all localities: 36 | after 1990: 30 |
| Number of all records: 40 | after 1990: 31 |

| |
|---|
| Extent of Occurrence (EOO): 1,562 km ² |
| Area of Occupancy (AOO): 96 km ² |

% of records per period:

| | | |
|-----------|-----------|-----------|
| 1850-1920 | 1921-1990 | 1991-2013 |
| 5 | 17 | 78 |

IUCN Red List Criteria: VU B1ab(ii,iii)+2ab(ii,iii)

IUCN Red List Category: VULNERABLE

References & Synonymy:

Platysticta maculata, Hagen in Selys, 1860, Bull. Acad. r. Belg. (2) 10: 437.

Disparoneura maculata - HAGEN (1859): 206; *Platysticta maculata* - SELYS (1860b): 437; SELYS (1886): 151; KIRBY (1890): 132; KIRBY (1894): 546, 561; LAIDLAW (1915): 387; LAIDLAW (1917b): 341; MUNZ (1919): 77, pl. 19; LAIDLAW (1924): 361; FRASER (1931a): 67, fig 2c; FRASER (1931b): 326-327, pl. II, figs.1&2; FRASER (1933a): 121-123, fig. 57; FRASER (1933b): 201-206, 217, figs. 1a-b; LIEFTINCK (1955): 70; FERNANDO (1964): 190; LIEFTINCK (1971a): 190, 206; DAVIES & TOBIN (1984): 107; TSUDA (1986): 3, 213; FERNANDO (1990): 186; BRIDGES (1994): VII.142; BEDJANIĆ (1998): 9, 31, 59, 63-64, 67, 76; DE FONSEKA (2000): 12, 70-71, 208 (*pars?*); 283; IUCN SRI LANKA (2000): 25; BEDJANIĆ (2004): 283, 287; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2007): 16; VAN TOL (2009): 9; *Platysticta greeni* - KIRBY (1891): 204-205, figs. 3, 3a; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 7; *Platysticta apicalis* - FRASER (1931b): pl I, fig. 5; *Platysticta maculata maculata* - VAN TOL (1992): 145;

Faunistic records: APPENDIX 2, page 298-299;

Platysticta sp. nov. A Bedjanič & van Tol, in prep.

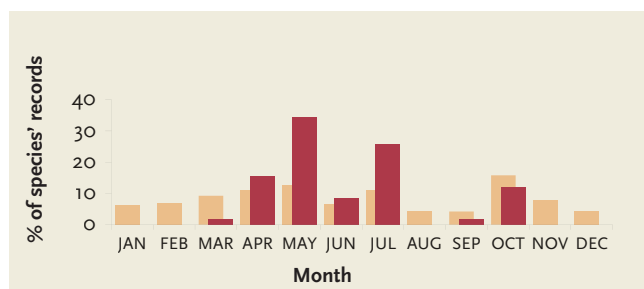
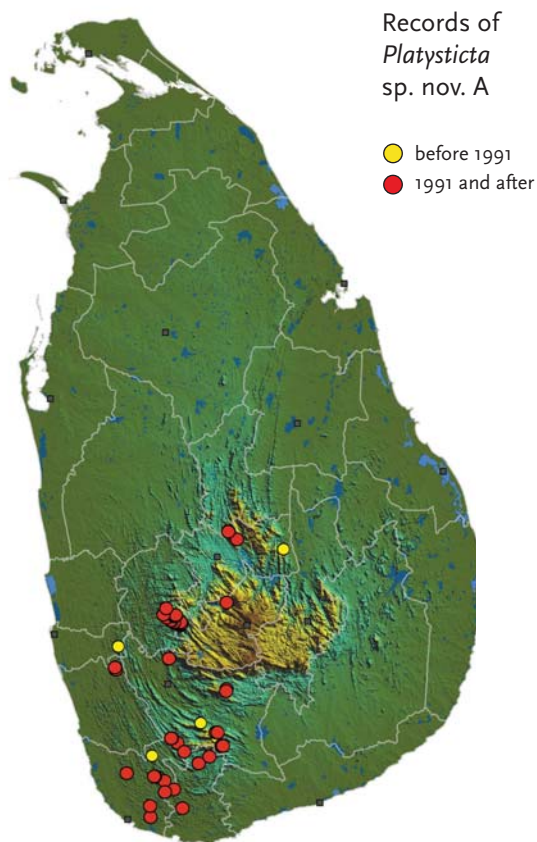
ENDEMIC

From the distribution map and number of records of the Forestdamselfy treated here and labelled tentatively as *Platysticta* sp. nov. A, it is evident that the species is most probably the commonest representative of its genus on the island.

It is a very large elegant damselfly, quite easily recognized by the bluntly pointed bulges on the prothorax, which is coloured white and black. Adult males have wing apices tipped with dark brown and the females do not have longitudinal black markings on the blue dorsum of the last abdominal segments.

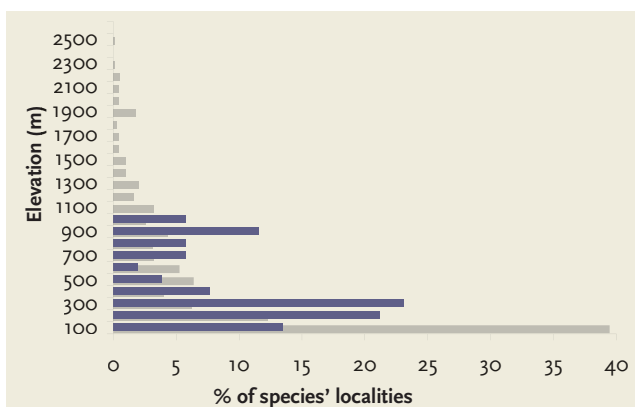
The relative scarcity of older records and the earlier described unfortunate confusion of the doyen of Indian odonatology, F. C. Fraser, resulted in its being treated as *P. maculata* for so long.

The recent fieldwork and comparison of material from museums in Europe and the United States have finally shown that the true *P. maculata*, described by H. A. Hagen, is actually clearly different. Therefore, our unfortunate orphan needs a new scientific name and tidy description, which will be published elsewhere.



Number of all localities: **54** after 1990: **46**

Number of all records: **65** after 1990: **54**





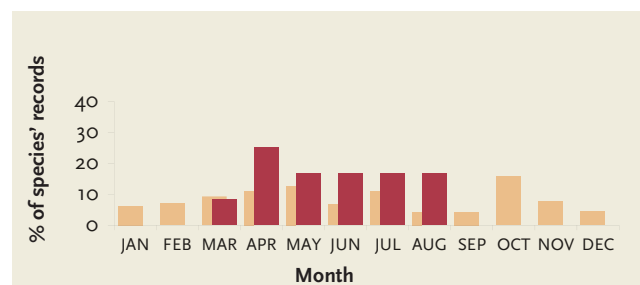
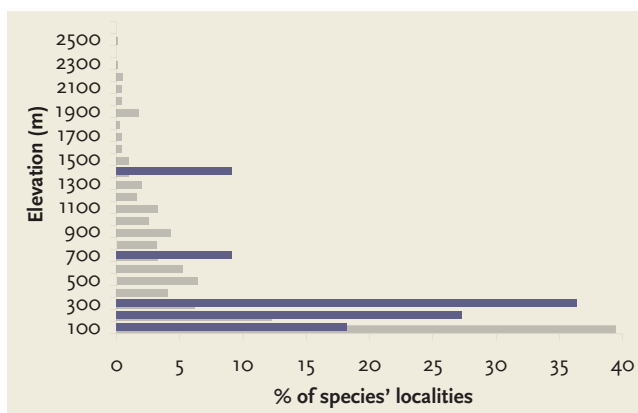
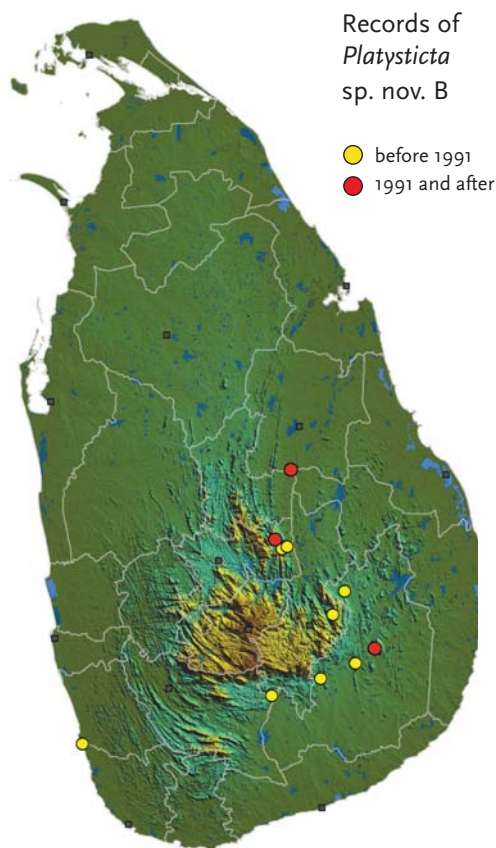
Platysticta sp. nov. B Bedjanič & van Tol, in prep.

ENDEMIC

Quite unexpectedly, a new Forestdamsel, treated here as *Platysticta* sp. nov. B, was discovered by Matjaž Bedjanič during a visit to the Natural History Museum in London some years ago. Several males, labeled as originating from Madulsima and Bentota, were mixed and unnoticed among the specimens of *P. apicalis*.

At a glimpse, this new species is truly quite similar to the latter, however, the males have clearly different inferior anal appendages, without a notch before its upturned point, as is the case in *P. apicalis*. Unlike the latter, the females are without black markings on the blue dorsum of the last abdominal segments and interestingly, have dark brown apices of the wings as do their mates.

Additional material has been found in the entomological collection of the Smithsonian Institution and only in 2009 was this new and yet undescribed *Platysticta* re-discovered near Monaragala and at some other localities in the eastern part of Sri Lanka. It is clear now that the old Bentota record on the western coast is most surely a mistake due to the wrong labeling of the museum specimen since the species is peculiar in inhabiting much drier eastern parts of the island. Here, the populations are widely scattered and threatened.



Number of all localities: **11** after 1990: **3**

Number of all records: **12** after 1990: **3**





PROTONEURIDAE

Threadtails

Elattoneura caesia (Hagen, 1860)

Jungle Threadtail

ENDEMIC

Threadtails are medium-sized, dark damselflies found in a variety of habitats, predominantly in the central and southwestern part of Sri Lanka. All six species known from Sri Lanka are endemic to the island, with their nearest relatives in southern India and elsewhere in South East Asia.

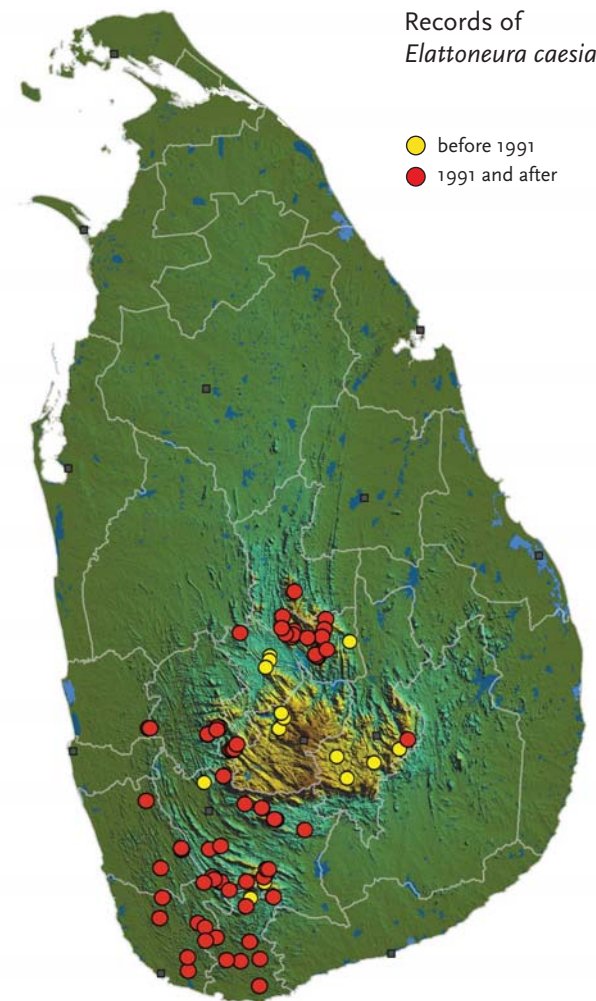
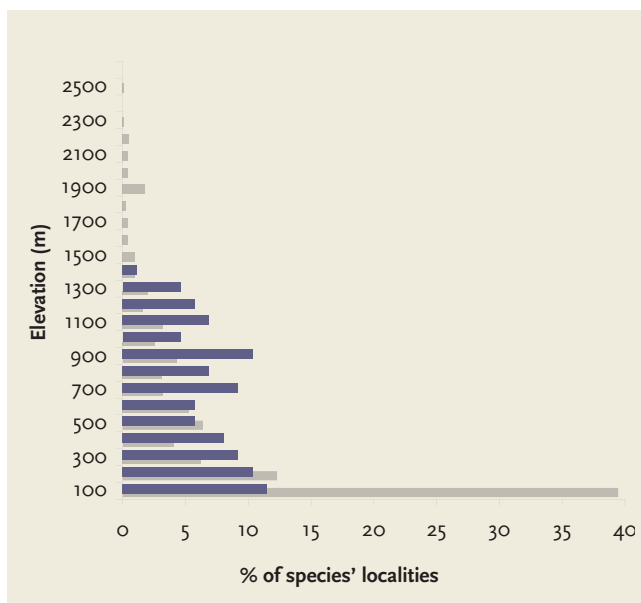
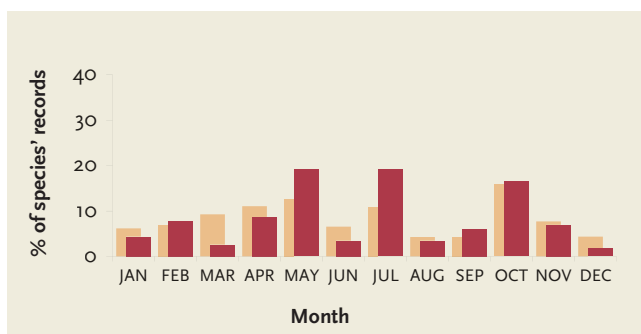
A dark body, with shades of steely blue and whitish to light blue pruinescence on the male's thorax is an easily recognizable trademark of *Elattoneura caesia*. The pruinescence tends to become lighter with age, and expand in extent, while in contrast the juvenile male has no pruinescence and is similar to the female. The latter sex, only recently correctly described by CONNIFF & VAN DER POORTEN (2008) is mostly black with yellow spots on the face, and light stripes across the prothorax continuing onto the dorsum and also present on the sides of the thorax. Of note, the female lacks posterior projections on the prothorax, unlike the other Sri Lankan species of the genus.

This beautiful endemic Threadtail inhabits similar habitats as its commoner congener *E. centralis*, with the habitat spectrum comprising fast running streams with dense vegetation, and also small seeps, slow running streams and marshy areas, with a mosaic of shade and sun. Males are usually seen at or near a water source, settled horizontally on vegetation, making frequent sallies to catch food. On the other hand, females frequent surrounding shrubs and visit the wet areas where the males are only for the purpose of mating (CONNIFF & VAN DER



POORTEN, 2008). Larvae and life cycle need further study as nothing is known at this time. The species is found from the lowlands and the mid to upper hill areas of Sri Lanka all year round, but April to November seems to be its main flight season. Until recently it has been only rarely recorded, with most of the historical data originating from the central part of the island. However, fieldwork in last few years revealed many new records in the hilly areas of the southwest as well as in the Knuckles mountain range and its outskirts.

The habitats of *E. caesia* are under pressure mainly due to the destruction of natural forests and water extraction. However, at least in the short term it can obviously survive also in degraded landscapes. In the light of newly accumulated data, the status of this globally threatened Endangered species as assessed by BEDJANIĆ (2006a, 2009b) should be changed to a Near Threatened species according to the IUCN Red List Criteria.



| | |
|-------------------------------------|------------------------|
| Number of all localities: 89 | after 1990: 73 |
| Number of all records: 128 | after 1990: 104 |

| |
|--|
| Extent of Occurrence (EOO): 12,214 km² |
| Area of Occupancy (AOO): 276 km² |

% of records per period:

1850-1920 1921-1990 1991-2013

| | | |
|----------|-----------|-----------|
| 3 | 16 | 81 |
|----------|-----------|-----------|

IUCN Red List Criteria: **NOT APPLICABLE**

IUCN Red List Category: **NEAR THREATENED**

References & Synonymy:

Alloneura caesia, Hagen in Selys, 1860, Bull. Acad. r. Belg. (2)10: 450.

Alloneura caesia - SELYS (1860b): 450; *Disparoneura caesia* - SELYS (1886): 167; KIRBY (1890): 133; KIRBY (1891): 205; KIRBY (1894): 562; KIRBY (1905): 272; LAIDLAW (1915): 388; LAIDLAW (1917b): 323; FRASER (1923e): 743; FRASER (1933a): 229, 240-241; *Elattonneura caesia* - COWLEY (1936): 518, 523; LIEFTINCK (1940): 92; LIEFTINCK (1955): 73; FERNANDO (1964): 190; LIEFTINCK (1971a): 195, 206; DAVIES & TOBIN (1984): 110; TSUDA (1986): 5, 214; FERNANDO (1990): 186; VAN TOL (1992): 57; BRIDGES (1994): VII.40; BEDJANIĆ (1998): 9, 16, 34-35, 58, 63, 67, 76; DE FONSEKA (2000): 12, 73-74, 208, 283, fig. B61; IUCN SRI LANKA (2000): 25; BEDJANIĆ (2002): 6, 14; BAMBARADENIYA et al. (2004): 1740; DE SILVA WIJAYERATNE et al. (2003): pl. 3; BEDJANIĆ (2004): 284, 287, 289; BEDJANIĆ (2006a): www.iucnredlist.org; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23, 25; BEDJANIĆ et al. (2006): pl. 8; BEDJANIĆ et al. (2007): 16, 106-107; IUCN SRI LANKA & MOENR (2007): 46; CONNIFF & VAN DER POORTEN (2008): 361-366, figs. 1-7; WCSG (2008): 9, 15; WCSG (2009): 10, 14; BEDJANIĆ (2009b): www.iucnredlist.org; VAN DER POORTEN (2009b): 56; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 7;

Elattoneura centralis (Hagen, 1860)

Dark-glittering Threadtail

ENDEMIC



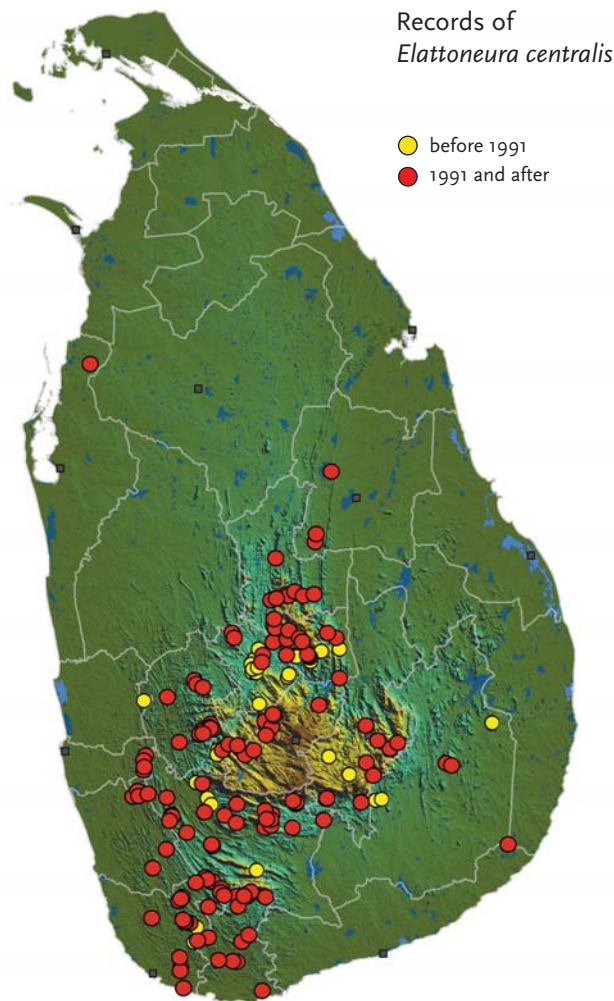
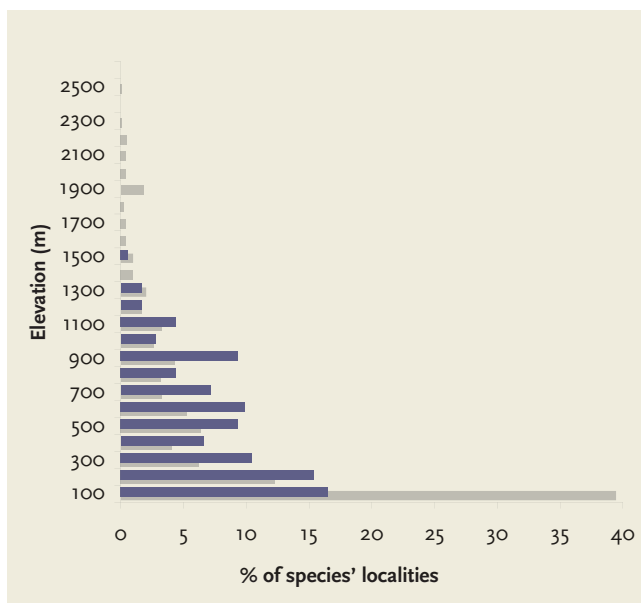
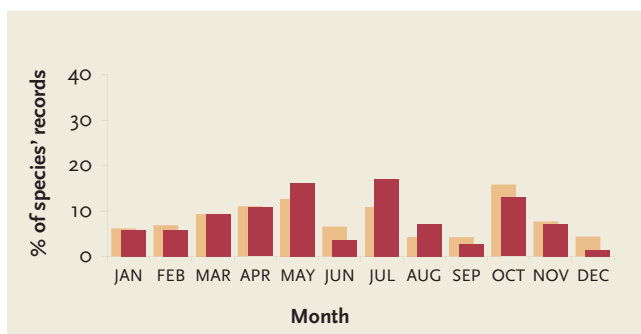
One of the commonest damselflies in Sri Lanka, firmly holding third rank in the number of localities among endemic species, is *Elattonneura centralis*. This lovely dark Threadtail has a metallic purple sheen on its thorax and abdomen. It is similar in size and general appearance to *E. caesia* but lacks pruinescence and cannot be confused except as a juvenile which is similar in colouration to the female. The latter is identified by a pair of prominent backward pointing spines on the posterior segment of the prothorax that are just visible to the naked eye (CONNIFF & VAN DER POORTEN, 2008).

Similar to *E. caesia*, the species inhabits fast running streams with dense vegetation. However, its habitat spectrum is broader and it is also found at large rivers, stagnant pools, seeps, and small slow running streams with or without dense vegetation. The males are often seen hovering above the water surface or resting on rocks or hanging from vegetation near the water source while females come to the water only to mate and are therefore not often seen. In tandem with a male, they oviposit into vegetation along the streams especially in the

eddies where the water is slow (CONNIFF & VAN DER POORTEN, 2008). The larva of *E. centralis* has not been described and still only very little is known about its life cycle and biology.

In general, the species can be seen all year round, with peaks in certain months according to the region. It occurs from the lowlands to the mid-hills. The vast majority of the records originate from the central and southwestern part of the island, but it has also been sparsely recorded in the dry zone, e.g. from Wilpattu and Wasgamuwa National Parks as well as from the vicinity of Giritale in the north and from Yala National Park and lowland surroundings of Moneragala in the southeast.

Without past data for comparison, the population trend is unknown for *E. centralis*, but it seems to be an adaptable species with wide ecological tolerance and can also survive in disturbed habitats. Therefore it is currently assessed as not endangered and ranked as Least Concern.



| | |
|--------------------------------------|------------------------|
| Number of all localities: 183 | after 1990: 147 |
| Number of all records: 241 | after 1990: 194 |

| |
|--|
| Extent of Occurrence (EOO): 31,294 km² |
| Area of Occupancy (AOO): 620 km² |

% of records per period:

1850-1920 1921-1990 1991-2013



IUCN Red List Criteria: **NOT APPLICABLE**

IUCN Red List Category: **LEAST CONCERN**

References & Synonymy:

Alloneura centralis, Hagen in Selys, 1860, Bull. Acad. r. Belg. (2) 10: 449.

Disparoneura centralis - HAGEN (1859): 207; SELYS (1860): 449; KIRBY (1890): 133; KIRBY (1894): 546, 562; LAIDLAW (1915): 388; LAIDLAW (1917b): 323; FRASER (1923e): 743; LAIDLAW (1924): 366; FRASER (1933a): 229, 238-240; *Alloneura centralis* - SELYS (1860b): 449; *Caconeura mackwoodi* - FRASER (1919b): 875-877; FRASER (1923e): 743; LAIDLAW (1924): 368; *Disparoneura caesia* - LAIDLAW (1924): 365-366, fig. 13; *Elattonneura centralis* - COWLEY (1936): 518, 523; LIEFTINCK (1940): 92; LIEFTINCK (1955): 73; FERNANDO (1964): 190; KIMMINS (1966): 202; LIEFTINCK (1971a): 195, 206; COSTA & STARMÜHLNER (1972): 54; DAVIES & TOBIN (1984): 110; STARMÜHLNER (1984): 230; TSUDA (1986): 5, 214; FERNANDO (1990): 186; VAN TOL (1992): 61; BRIDGES (1994): VII.46; DE BEDJANIĆ (1998): 9, 15, 34-35, 58, 63, 67, 76; FONSEKA (2000): 12, 74-75; IUCN SRI LANKA (2000): 26; BEDJANIĆ (2002): 5-6, 14; DE SILVA WIJEYERATNE et al. (2003): pl. 3; BEDJANIĆ (2004): 284; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2006): pl. 8; BEDJANIĆ et al. (2007): 16; 108-109; CONNIFF & VAN DER POORTEN (2008): 361-366, figs. 1-7; WCSG (2008): 15; WCSG (2009): 14; VAN DER POORTEN (2009b): 56; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 7;

Elattoneura leucostigma (Fraser, 1933)

Smoky-winged Threadtail

ENDEMIC

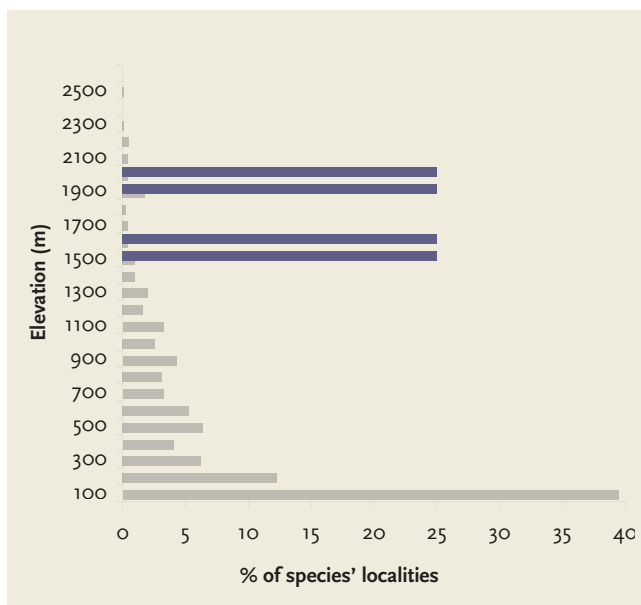
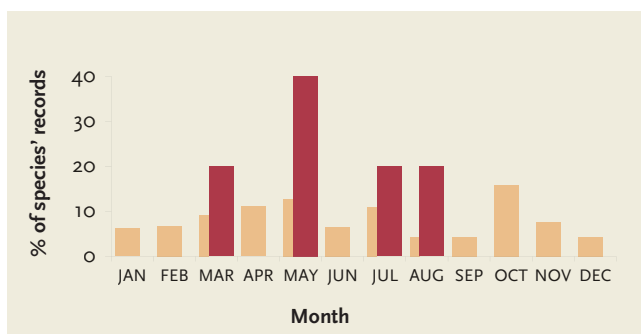
Two endemic Threadtails—*Elattoneura leucostigma* described by F. C. Fraser (FRASER, 1933c) and *Disparoneura ramajana* described by M. A. Lieftinck (LIEFTINCK, 1971a)—have been unsolved odonatological puzzles for many decades. Neither of them had been found since their original descriptions. *E. leucostigma* was recorded in May 1927 from a forest stream in the mountains around Nuwara Eliya and only a single immature male of *Disparoneura ramajana* was recorded in March 1962 from the wet and dense low montane forest at Horton Plains. Due to unsuccessful searches for both these montane species and due to the fragmentation and destruction of the natural habitats in the wider surroundings of Nuwara Eliya, they were declared as globally threatened Critically Endangered endemics (BEDJANIČ, 2006a).

However, in 2007 while inspecting Fraser's dragonfly collection in the Natural History Museum in London, the situation began to evolve. By carefully examining Fraser's types and Lieftinck's original description and figures, Matjaž Bedjanič determined that both taxa are actually conspecific (BEDJANIČ, 2012b) and hence *D. ramajana* is only a synonym of *E. leucostigma*. Further to that, a small population of *E. leucostigma* was discovered by Matjaž Bedjanič and Sampath Gunasinghe in May and August 2009 in the small Tangemale Bird Sanctuary near Haputale. In July 2012, this enigmatic dark Threadtail with light coloured pterostigma was found in another small stream close to the Tangemale Sanctuary in the course of the fieldwork supported by the Rufford



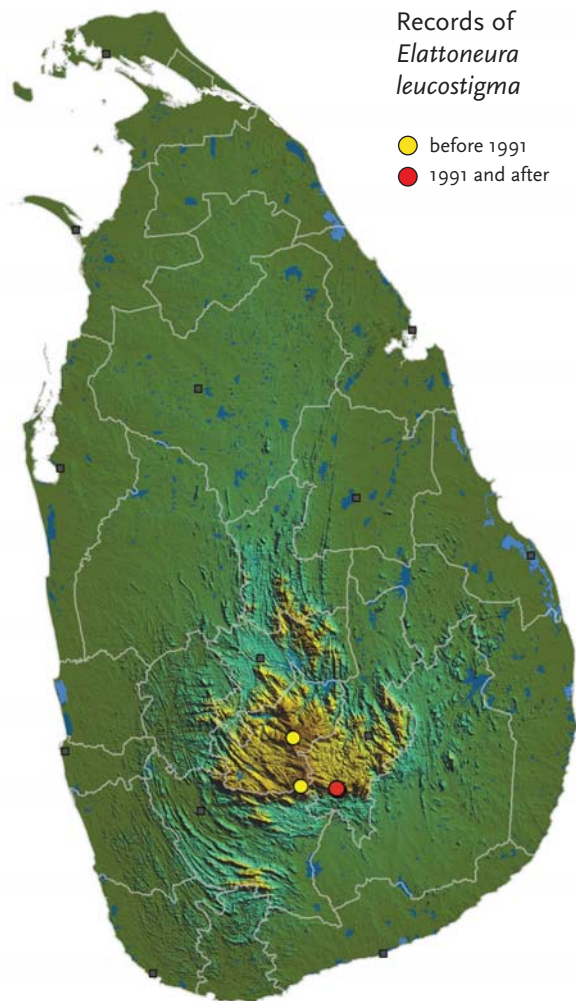
Foundation (BEDJANIČ, 2012c). Unfortunately, this small pocket of natural montane vegetation is surrounded by tea plantations and the small stream is drained for irrigation and drinking water, while the one in Tangemale is even used by local people for washing laundry (DE SILVA WIJEYERATNE, 2012b).

Despite much new knowledge and the recent discovery of new localities, *E. leucostigma* is still only poorly known. Because of its very limited distribution and the destruction of natural habitats in the last few decades due to the cultivation of tea and other crops, the clearing of forest and the draining of small streams for agriculture and domestic use, its status as a globally Critically Endangered species remains unchanged (BEDJANIČ, 2006a, 2009b). Hope remains that it still lives in the streams of the remaining montane forests around Nuwara Eliya, Hakgala, Horton Plains and the Peak Wilderness. However, this can only be confirmed by further research and fieldwork.



| | |
|-----------------------------|---------------|
| Number of all localities: 4 | after 1990: 2 |
| Number of all records: 5 | after 1990: 3 |

% of records per period:



| | |
|-----------------------------|---------------------|
| Extent of Occurrence (EOO): | 166 km ² |
| Area of Occupancy (AOO): | 12 km ² |

IUCN Red List Criteria: CR B1ab(ii, iii)+2ab(ii, iii)

IUCN Red List Category: CRITICALLY ENDANGERED

References & Synonymy:

Disparoneura leucostigma, Fraser, 1933, Ceylon J. Sci. (B) 17(3): 225-226.

Disparoneura leucostigma - FRASER (1933c): 225-226; KIMMINS (1966): 225; *Elattonneura leucostigma* - COWLEY (1936): 518, 523; LIEFTINCK (1955): 73; FERNANDO (1964): 190; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1984): 110; TSUDA (1986): 5, 214; FERNANDO (1990): 186; VAN TOL (1992): 138; BRIDGES (1994): VII.133; BEDJANIĆ (1998): 9, 35, 58, 63, 67, 76; DE FONSEKA (2000): 12, 75-76, 283; IUCN SRI LANKA (2000): 26; BEDJANIĆ (2004): 284, 287, 289; BEDJANIĆ (2006a): www.iucnredlist.org; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23, 25; BEDJANIĆ et al. (2007): 16; BEDJANIĆ (2009b): www.iucnredlist.org; DE SILVA WIJEYERATNE (2012b) in PETHIYAGODA (2012): 186, 188; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 2, 7; *Disparoneura ramajana* - LIEFTINCK (1971a): 193, 206, figs. 3,4; LIEFTINCK (1971b): 130; DAVIES & TOBIN (1984): 109; GEIJSKES & KIAUTA (1984): 37; TSUDA (1986): 5, 214; VAN TOL (1992): 191; WATSON (1992): 196, 198; BRIDGES (1994): VII.197; SCHNEIDER & DUMONT (1995): 119; BEDJANIĆ (1998): 10, 31, 58, 63-64, 67, 76; DE FONSEKA (2000): 12, 72, 208, fig. B58; IUCN SRI LANKA (2000): 25; BEDJANIĆ (2004): 284, 287, 289; BEDJANIĆ (2006a): www.iucnredlist.org; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23, 25; BEDJANIĆ et al. (2007): 16; IUCN SRI LANKA & MOENR (2007): 46; DE SILVA WIJEYERATNE (2012b) in PETHIYAGODA (2012): 186; *Disparoneura ramapana* (sic!) - FERNANDO (1974): 66; FERNANDO (1990): 260; *Disparoneura ramjana* (sic!) - RAM (1986): 34; IUCN SRI LANKA & MOENR (2007): 46; *Elattonneura leucostigma* [syn. *Disparoneura ramajana* Lieftinck, 1971] - BEDJANIĆ (2012b): 77-79;

Faunistic records: APPENDIX 2, page 299;

Elattoneura oculata (Kirby, 1894)

Two-spotted Threadtail

ENDEMIC

The name of *Elattoneura oculata* has been long hidden and almost forgotten under the synonymy of *E. centralis*. It took quite some detective skills and a study visit to old collections of the Natural History Museum in London to reveal that this was incorrect and also to confirm that *Elattoneura bigemmata*, described by M. A. Lieftinck in 1971, is actually a junior synonym of the species described already in 1894 as *Disparoneura oculata* by W. F. Kirby (BEDJANIČ, 2008).

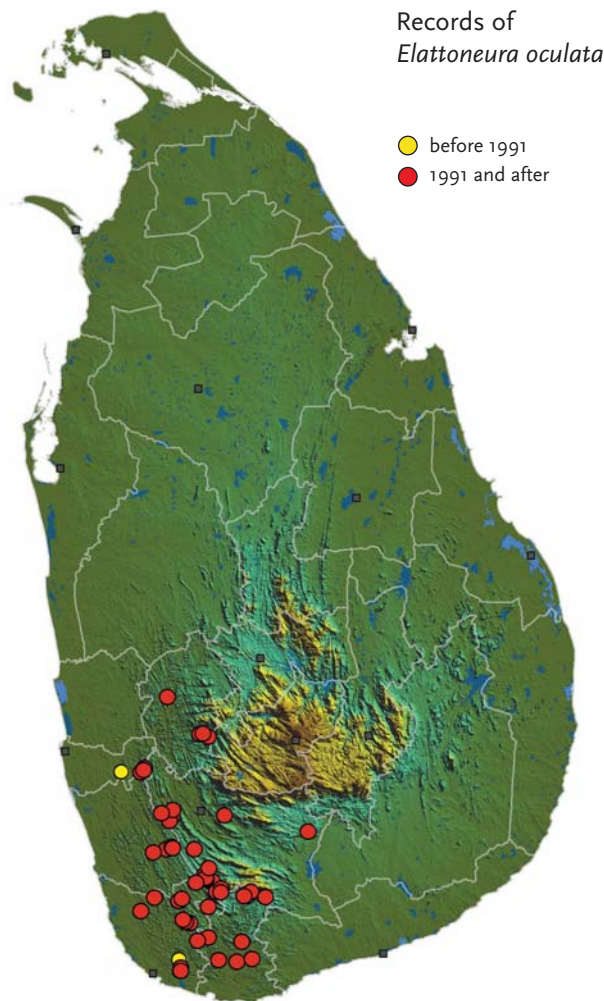
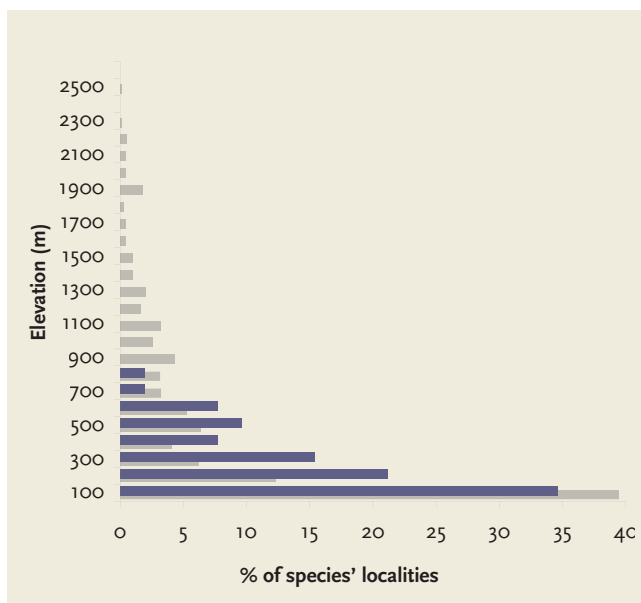
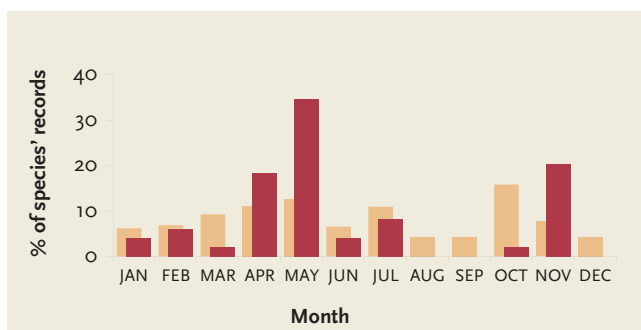
As suggested by its valid name and even more by its synonym, the presence of two brightly coloured spots on the upper surface of the head is the most prominent distinguishing character of this beautiful endemic Threadtail. *E. oculata* is predominantly distributed in the lowlands of southwestern Sri Lanka, where it is met with in the vicinity of small streams and rivulets in the remaining primary rainforests and also along smaller flowing waters in disturbed landscapes that are shaded by a corridor of trees and bushes. The flight season of the adults seems to be quite long with peaks between April and July and in November.

It is interesting how much new knowledge on the distribution of *E. oculata* has been accumulated in just the last few years, since for long it has been known only from Kirby's and Lieftinck's type localities—Kottawa and Labugama east of Colombo (KIRBY, 1894; LIEFTINCK, 1971a). Even in 2008 only



about a dozen localities were known (BEDJANIČ, 2008), but currently this number exceeds 50! Only recently it has also been discovered at isolated localities southeast of Warakapola and south of Balangoda, which markedly extend the known range of the species to the north and to the east.

Based on the before-mentioned much scarcer data, *E. oculata* has been classified as a globally Endangered (BEDJANIČ, 2009b) as well as a nationally Endangered (VAN DER POORTEN & CONNIFF, 2012) dragonfly species. Numerous recent observations luckily show that these assessments have been too pessimistic. However, because of its known narrow habitat requirements and the known negative impacts on these habitats, its populations must have declined in the last few decades. Only future monitoring can show the current trend of *E. oculata* populations. Until then, it is still listed among globally threatened dragonflies under the Vulnerable category of the IUCN.



| | |
|------------------------------|----------------|
| Number of all localities: 52 | after 1990: 50 |
| Number of all records: 60 | after 1990: 57 |

| |
|---|
| Extent of Occurrence (EOO): 5,973 km ² |
| Area of Occupancy (AOO): 180 km ² |

% of records per period:

1850-1920 1921-1990 1991-2013



IUCN Red List Criteria: VU B1ab(ii,iii)+2ab(ii,iii)

IUCN Red List Category: VULNERABLE

References & Synonymy:

Disparoneura oculata, Kirby, 1894, J. linn. Soc. Lond., Zool. 24: 562-563.

Disparoneura oculata - Kirby (1894): 562-563; *Disparoneura oculata* - Laidlaw (1924): 366; *Disparoneura centralis* - Fraser (1933a): 239-240; *Elattonneura bigemmata* - Lieftinck (1971a): 193-195, 206, fig. 6; Lieftinck (1971b): 122; Davies & Tobin (1984): 110; Geijskes & Kiauta (1984): 37; Tsuda (1986): 5, 214; Van Tol (1992): 52; Bridges (1994): VII.32; Bedjanić (1998): 10, 15-16, 31-34, 58, 63, 67, 72, 76, 79 – app. 5.1.E-F, figs. 13-15; De Fonseca (2000): 12, 72-73, 208, fig. B59, pl. 5; IUCN Sri Lanka (2000): 25; Bedjanić (2002): 1, 6, 11-14, 17, figs. 2-4; De Silva Wijeyeratne et al. (2003): pl. 3; Bedjanić (2004): 284, 287; Bedjanić (2006b) in Bambaradeniya (2006): 23; Bedjanić et al. (2006): pl. 8; Bedjanić et al. (2007): 16; 104-105; WCSG (2008): 15; WCSG (2009): 14; Bedjanić (2009b): www.iucnredlist.org; Chandana et al. (2012): 70; *Elattonneura bigeminata* (sic!) - Fernando (1974): 66; Fernando (1990): 260; *Elattonneura oculata* - Van der Poorten (2009b): 56; Van der Poorten & Coniff (2012) in MOE (2012): 7;

Elattonneura oculata [syn. *Elattonneura bigemmata* Lieftinck, 1971] – Bedjanić (2008): 145-150, figs. 1-2;

Faunistic records: APPENDIX 2, page 299-300;

Elattoneura tenax (Hagen, 1860)

Red-striped Threadtail

ENDEMIC

Charming ruby red eyes, red band across the top of the head, dark orange stripes on the thorax and bigger size, make males of *Elattoneura tenax* easy to identify and separate from its smaller relatives. Also the red and yellow markings on the female's head and the bright yellow thoracic stripes don't allow confusion with any other Threadtail found in Sri Lanka.

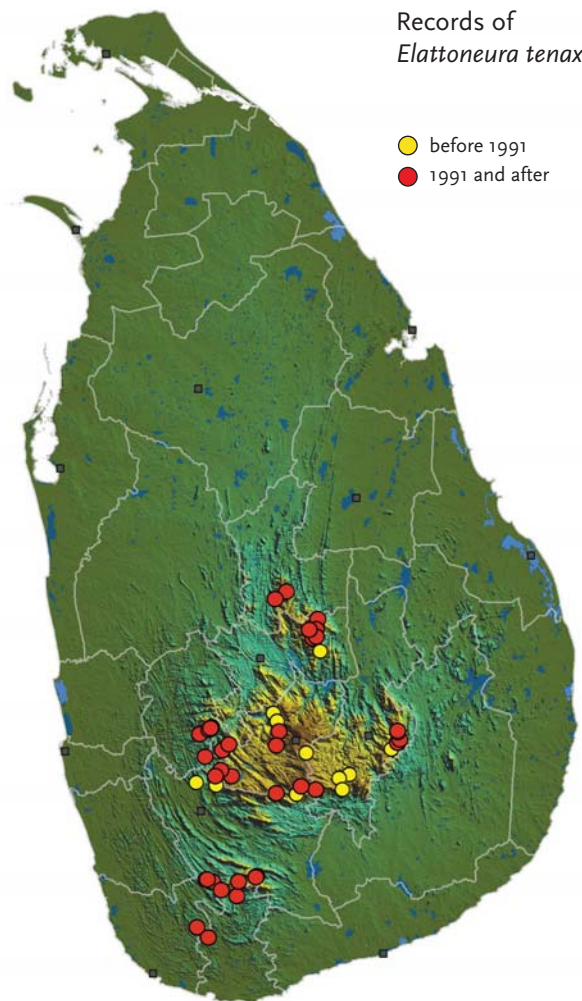
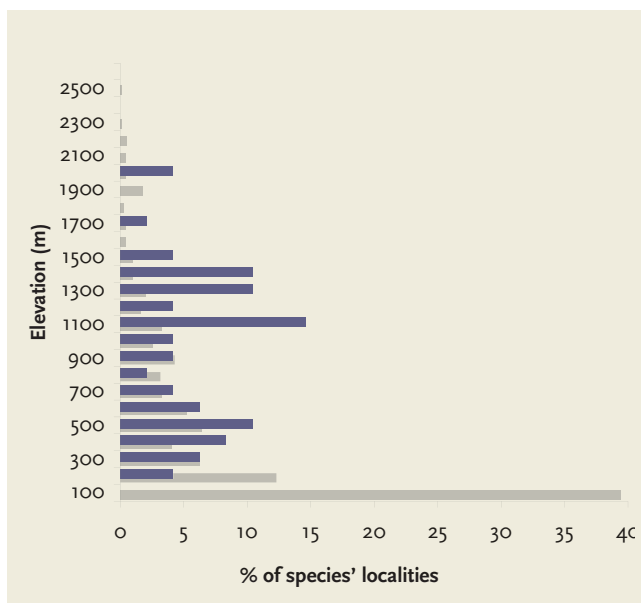
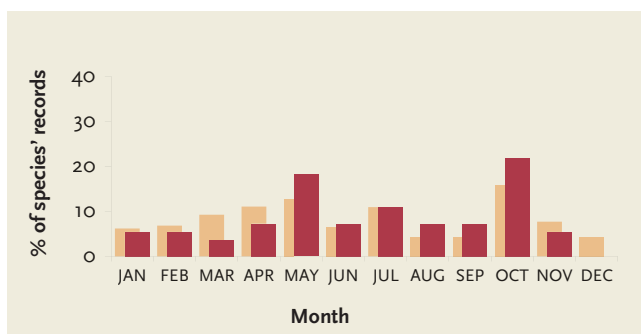
The species was among the first reported from Sri Lanka more than 150 years ago by H. A. Hagen (HAGEN, 1858; 1859) and subsequently described by him in Selys' Synopsis des Agrionines (HAGEN in SELYS, 1860b). As for many endemics, the type locality of *E. tenax* is Rambodde. Recently, the knowledge on its distribution has been greatly expanded and it is known from clusters of not very distant localities in the Knuckles, in the Central Highlands and its outskirts, around Kithulgala, in Sinharaja and Kanneliya forests as well as around Haputale and Passara in the southeast.

E. tenax is found predominantly in the mid-hill regions but also up to 1,500 or even 2,000 metres. Adults are on the wing the whole year round but the peak of its flight season seems to be in May and October. It prefers clean, moderately fast flowing streams with shaded banks, thus probably being quite sensitive to various human activities. It lives



in small populations and is never very numerous at a site. Males are usually found resting on rocks in swift flowing mountain streams or on leaves near the waterbed. Females can be found in the trees and shrubs next to the streams and are usually only seen when in the firm grasp of a male's anal appendages during the act of mating or ovipositing, which takes place into soft plant material. As with its other congeners, larval stages of *E. tenax* are unknown and life cycle information is only fragmentary.

So far, the threat status of *E. tenax* has not been assessed on the global level, but as evident from the data and continuing exacerbating pressures on its habitats in the central and southwestern part of Sri Lanka, it belongs among the globally endangered dragonflies. Nationally, it was ranked as an Endangered species by VAN DER POORTEN & CONNIFF (2012) and globally, it is assessed in the present work as a species of the Vulnerable IUCN Red List Category.



| | |
|-------------------------------------|-----------------------|
| Number of all localities: 48 | after 1990: 35 |
| Number of all records: 57 | after 1990: 43 |

| |
|---|
| Extent of Occurrence (EOO): 7,124 km² |
| Area of Occupancy (AOO): 168 km² |

% of records per period:



IUCN Red List Criteria: **VU B1ab(ii,iii)+2ab(ii,iii)**

IUCN Red List Category: **VULNERABLE**

References & Synonymy:

Alloneura tenax, Hagen in Selys, 1860, Bull. Acad. r. Belg. (2) 10: 449.

Agrion tenax - HAGEN (1858): 478; TENNENT (1859): 282; TENNENT (1861): 454; MOTSCHULSKY (1863): 8; *Disparoneura tenax* - HAGEN (1859): 206; SELYS (1886): 168; KIRBY (1890): 133; KIRBY (1894): 545, 562, pl. XLI-fig. 2; LAIDLAW (1915): 388; LAIDLAW (1917b): 323; FRASER (1923e): 743; LAIDLAW (1924): 365, fig. 12; COWLEY (1932): 202; FRASER (1933a): 229, 240-241; *Alloneura tenax* - SELYS (1860b): 449. *Elattoneura tenax* - COWLEY (1936): 518, 526; LIEFTINCK (1955): 73; FERNANDO (1964): 190; ST. QUENTIN (1970): 259; LIEFTINCK (1971a): 195, 206; DAVIES & TOBIN (1984): 111; TSUDA (1986): 5, 214; FERNANDO (1990): 186; VAN TOL (1992): 219; BRIDGES (1994): VII.231; BEDJANIĆ (1998): 9, 15-16, 35-36, 58, 63, 67, 76, 80 – app. 5.1.G; DE FONSEKA (2000): 12. 76-77, 208a-b, pl. 6; IUCN SRI LANKA (2000): 26; BEDJANIĆ (2002): 5-6, 14; DE SILVA WIJEYERATNE et al. (2003): pl. 3; BEDJANIĆ (2004): 284, 287; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2006): pl. 8; BEDJANIĆ et al. (2007): 16; 110-111; WCSG (2009): iii, 10-11, 14, 33; VAN DER POORTEN (2012c) in PETHIYAGODA (2012): 183; DE SILVA WIJEYERATNE (2012b) in PETHIYAGODA (2012): 186, 188; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 7; *Elattoneuris* (sic!) *tenax* - COSTA & STARMÜHLNER (1972): 56; STARMÜHLNER (1984): 224;

Faunistic records: APPENDIX 2, page 300;

Prodasineura sita (Kirby, 1894)

Stripe-headed Threadtail

ENDEMIC

Despite belonging to a separate genus, *Prodasineura sita* in its general appearance and habits closely resembles other representatives of the family. It differs from them in details of wing venation and the shape of the anal appendages, while its colours are black with light creamy stripes. *P. sita* is slightly larger than *E. centralis*, with which it often co-occurs. It lacks any metallic reflex and its colouration becomes darker with age, with shades of brownish or grayish, so the light stripes are hardly visible in older individuals. Female identification is based on two small forward curved hooks on the posterior edge of the prothorax.

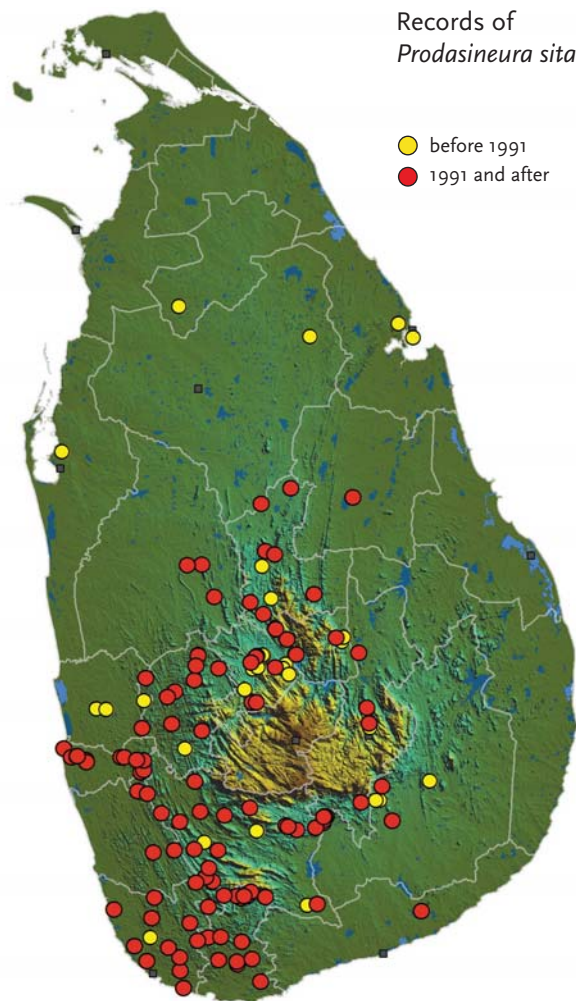
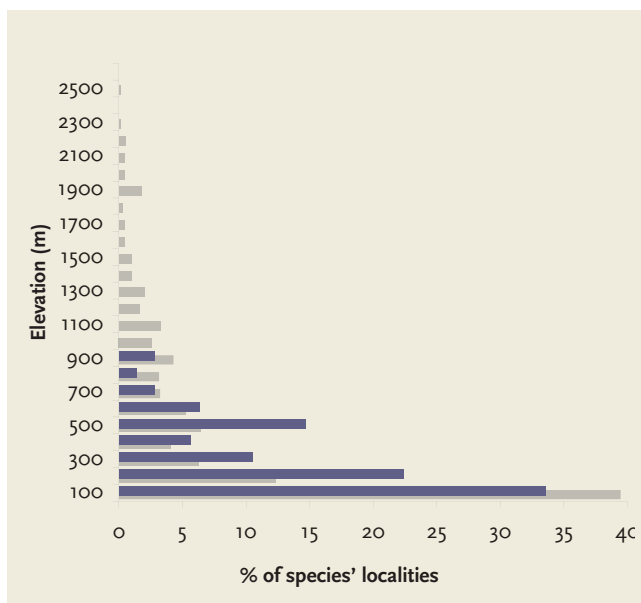
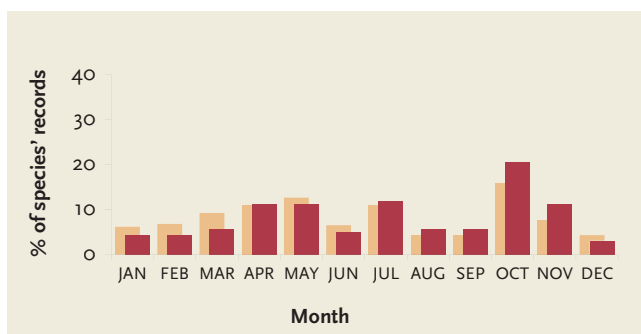
The species is most common in the lowlands up to the mid-hills of Sri Lanka, where it can be met with throughout the year. With the exception of the mountainous Central Highlands, most of the records come from the wet and intermediate zones. There are also a few records from the dry plains in the north and south of the island. However, at least at the northern localities, occurrence of *P. sita* has not been confirmed in recent years. This might just be a consequence of less intensive fieldwork in these regions or this rather inconspicuous damselfly has been simply overlooked.

P. sita inhabits different habitats ranging from slow rivers, streams, ditches, channels and vegetated



edges of paddy fields and large reservoirs. It is more common in shaded areas with some trees or scrub brush nearby. Males are usually seen restlessly hovering in the shade above the water. When females emerge nearby, they are eagerly pursued and grasped for mating. Oviposition is performed in tandem. As with the other Threadtails, the larval stages have not been described as yet, but some studies were started in Hiyare by members of the Wildlife Conservation Society of Galle where the larva was hatched. It will need further development and information to complete the study.

Due to its relatively wide distribution, many strong populations and apparent tolerability to slightly degraded habitats, the long term survival of this endemic species doesn't raise any real conservation concerns for now. On the national level it has recently been assessed as a species in the Least Concern IUCN category and the same view is adopted here also for its global Red List assessment.



| | |
|--------------------------------------|------------------------|
| Number of all localities: 145 | after 1990: 107 |
| Number of all records: 180 | after 1990: 135 |

| |
|--|
| Extent of Occurrence (EOO): 40,933 km² |
| Area of Occupancy (AOO): 500 km² |

% of records per period:

| 1850-1920 | 1921-1990 | 1991-2013 |
|-----------|-----------|-----------|
| 3 | 22 | 75 |

IUCN Red List Criteria: **NOT APPLICABLE**

IUCN Red List Category: **LEAST CONCERN**

References & Synonymy:

Disparoneura sita, Kirby, 1894, J. linn. Soc. Lond., Zool. 24: 563.

Disparoneura sita - KIRBY (1894): 563; *Caconeura sita* - LAIDLAW (1917b): 323, 348; FRASER (1923e): 743; LAIDLAW (1924): 367, 13a-b; FRASER (1933a): 212, 221-223; *Caconeura mackwoodi* - FRASER (1919b): 876-877; FRASER (1924): 504; KIMMINS (1966): 185; *Prodasineura sita* - COWLEY (1936): 521, 523; LIEFTINCK (1940): 91; LAIDLAW (1951): 81; LIEFTINCK (1955): 73; FERNANDO (1964): 190; LIEFTINCK (1971a): 195, 206, fig. 7a-b; COSTA & STARMÜHLNER (1972): 53; STARMÜHLNER (1984): 224; TSUDA (1986): 9, 214; FERNANDO (1990): 186; VAN TOL (1992): 210; BRIDGES (1994): VII.219; BEDJANIĆ (1998): 9, 15-16, 36, 58, 63, 67, 76; DE FONSEKA (2000): 12, 39, 77-78, 208, 283, fig. B62 a-b; IUCN SRI LANKA (2000): 26; BEDJANIĆ (2002): 5-6, 14; DE SILVA WIJAYERATNE et al. (2003): pl. 3; BEDJANIĆ (2004): 284; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2006): pl. 9; BEDJANIĆ et al. (2007): 16; 112-113; WCSG (2008): 15; WCSG (2009): 14; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 7;





AESHNIDAE

Hawkers





Anaciaeschna donaldi Fraser, 1922

Dark Hawker

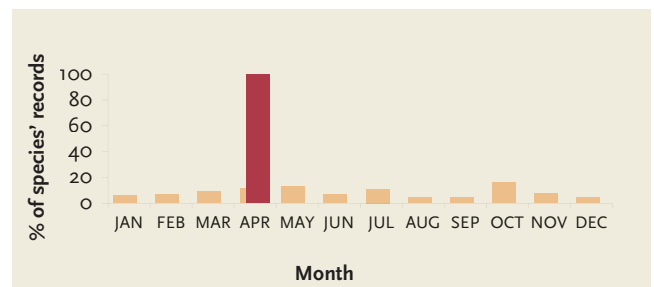
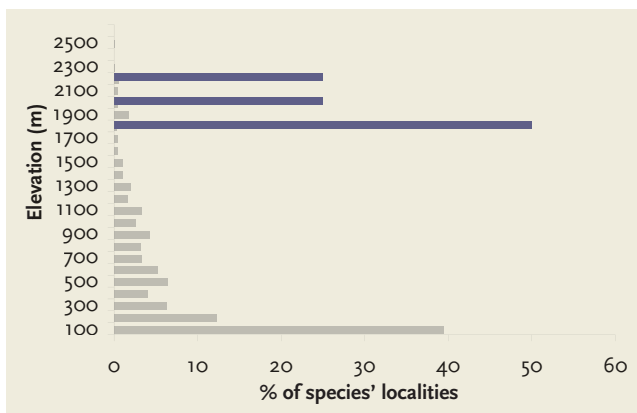
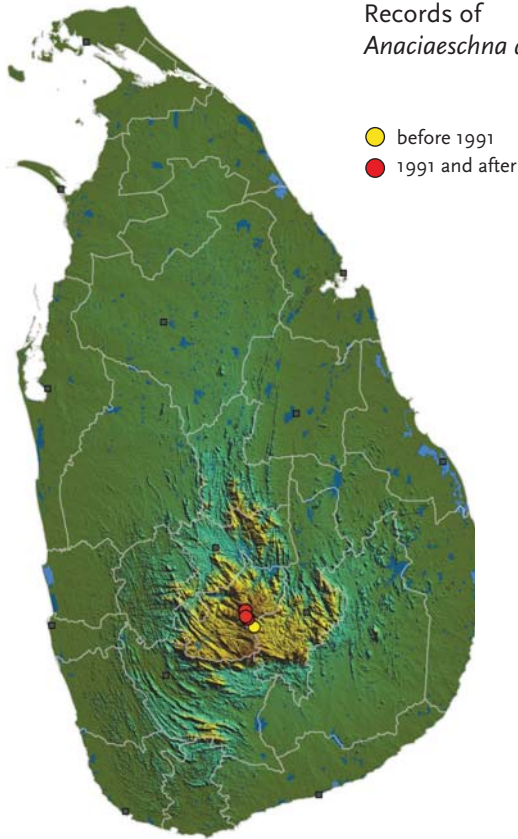
The first report of *Anaciaeschna donaldi* in Sri Lanka comes from DE FONSEKA (1990, 2000) who found a female specimen, taken in April 1924 in Hakgala and determined by F. F. Laidlaw, in the collection of the Colombo Museum.

According to FRASER (1936, 1943) the species is common in montane lakes of the Western Ghats in India. He also notes that the sexes are strikingly different in appearance. Unusually, females are observed commonly while ovipositing and males are rarely seen.

Following the trail of the old Sri Lankan record, this beautiful mountain species was finally rediscovered at three localities around Nuwara Eliya in April 2003 by Matjaž Bedjanič. The strongest population, with almost a dozen exuviae and observed emergence, was recorded at the northeastern border of Lake Gregory in the swampy wetland called Elephant Nook. A single exuvia has been found in a pond in Victoria Park and another in a small mountain swampy bog on the lower slope of Mt. Pidurutalagala above Nuwara Eliya.

Apart from that, nothing is known about the biology and status of *A. donaldi* in the island. It has been ranked as a nationally Critically Endangered species by VAN DER POORTEN & CONNIEFF (2012).

Records of
Anaciaeschna donaldi



| | |
|-----------------------------|---------------|
| Number of all localities: 4 | after 1990: 3 |
| Number of all records: 4 | after 1990: 3 |

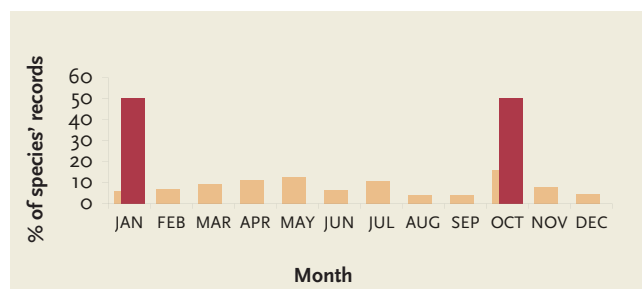
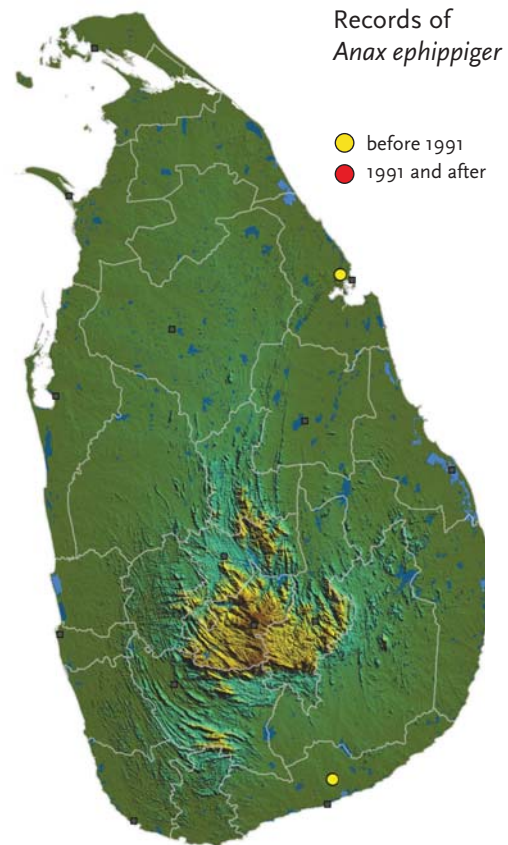
Anax ephippiger (Burmeister, 1839)

Vagrant Emperor

As suggested by its English name, *Anax ephippiger* is well known for its migratory habits. It has a wide distribution, ranging from Sri Lanka and India to the Mediterranean. In certain years with suitable weather conditions it can even migrate as far as northern Europe. The species was formerly placed in the genus *Hemianax*. It is the smallest of the Emperors met in Sri Lanka, characterized by brown eyes and brown to olivaceous thorax and abdomen, the latter having a blue marking only on the upper part of the second abdominal segment.

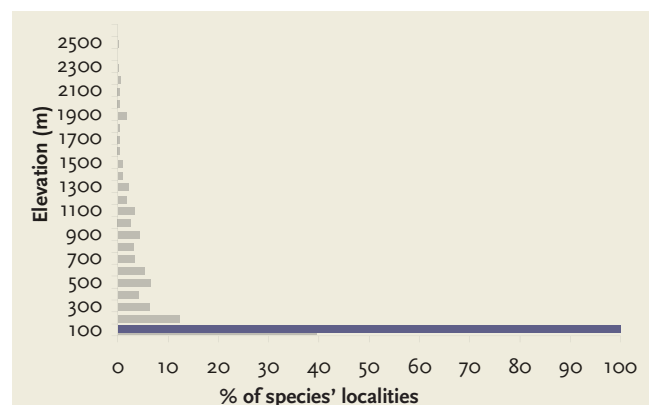
For Sri Lanka only two records exist. The first dates as far back as January 1892 from the Hot Wells near Trincomalee (KIRBY, 1894) and the other comes from a tank in Badagiriya near Hambantota, where a female was recorded by Smithsonian Institution researcher O. S. Flint back in October 1970.

In other countries, *A. ephippiger* is known to inhabit shallow standing waters with sparse emergent and water vegetation and its populations are transitory—in some years it is common but it may then disappear again. It is possible that this vagrant species is not resident in the island and only migrates periodically from India on the wings of the monsoon winds and rains. Perhaps, however, it occasionally establishes breeding populations that are just overlooked. Either case demands further research.



Number of all localities: 2 after 1990: 0

Number of all records: 2 after 1990: 0





Anax guttatus (Burmeister, 1839)

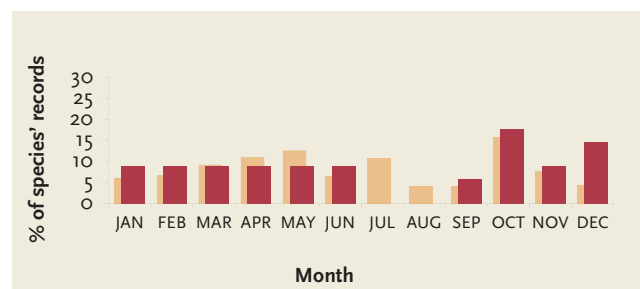
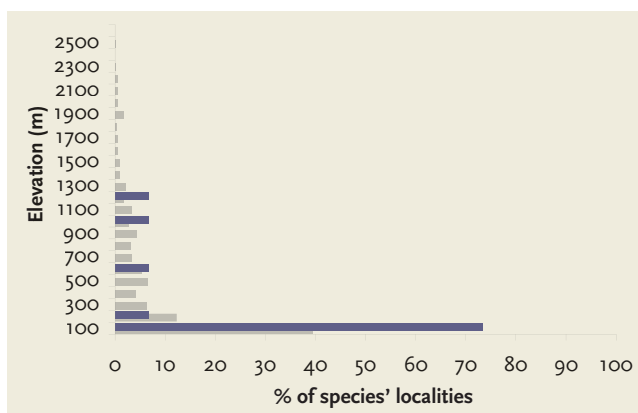
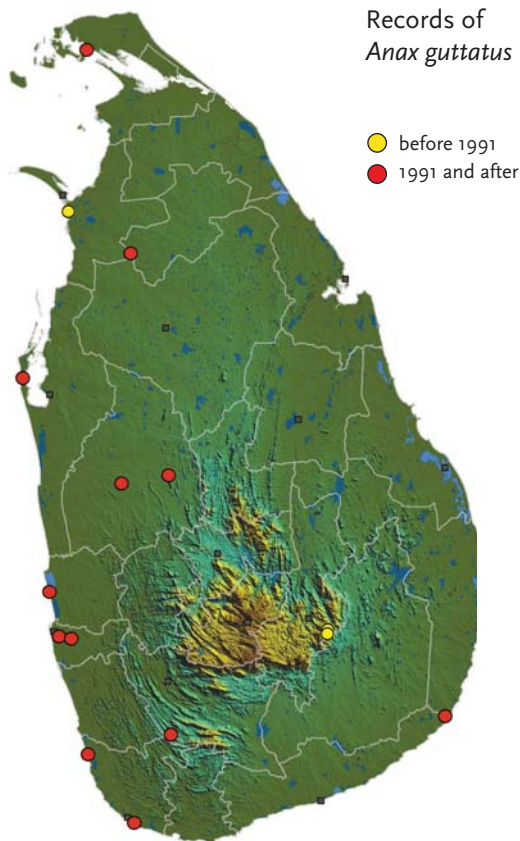
Pale-spotted Emperor

Distributed from Afghanistan and the Seychelles in the west, to Japan, Papua New Guinea, Micronesia and Australia in the east, *Anax guttatus* is one of the dragonflies with the widest range globally.

It is interesting that in Sri Lanka its records are surprisingly scarce. However, this may not reflect the real picture, but probably only shows the lack of field focus on stagnant waters in the northern and eastern lowland parts of the island and difficulties in determination by less experienced observers. Superficially, the species resembles *A. indicus*. However, the markings on the abdomen serve to rather easily separate both, even when on the wing. *A. guttatus* has isolated orangish, greenish-yellow or reddish-brown lateral abdominal spots and an unmarked dark brown last abdominal segment. In *A. indicus*, these markings are larger, partly fused, a deeper orangish colour and also present on the last segment of the abdomen.

A. guttatus is usually reported from tanks where males can be seen restlessly cruising around, defending their territories and catching prey. They only rarely settle and are seen during the day as well as at dusk. It should be noted to Sri Lankan naturalists and photographers that *A. guttatus* and *A. indicus* can occur together at the same locality so the quest for new well documented species' records is quite challenging in all respects.

Records of
Anax guttatus



Number of all localities: 15

after 1990: 12

Number of all records: 35

after 1990: 31

Anax immaculifrons Rambur, 1842

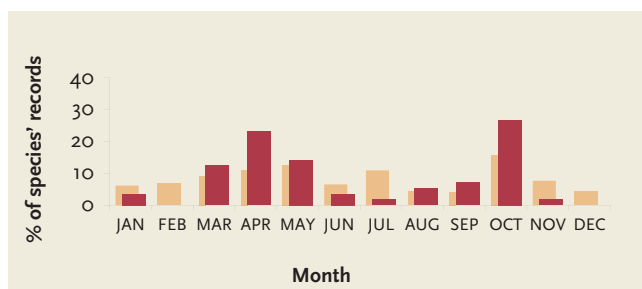
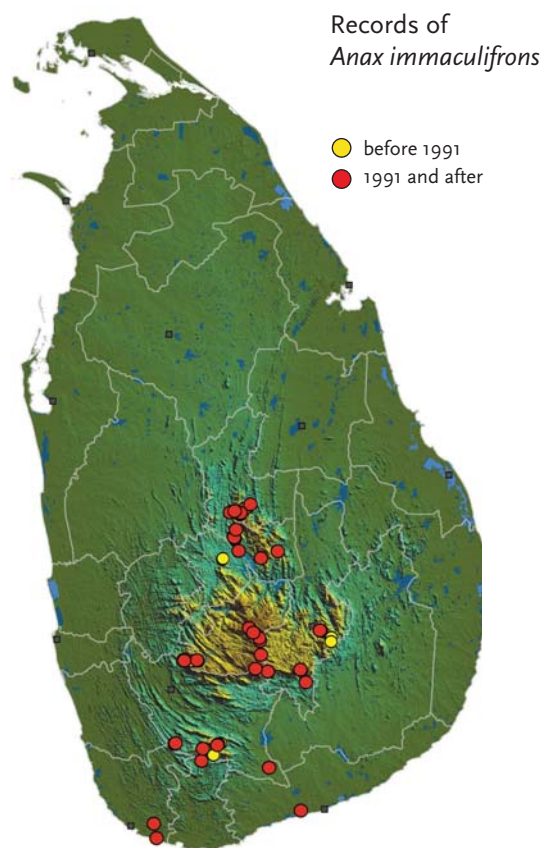
Fiery Emperor

Another Emperor of impressive size, *Anax immaculifrons* is easily distinguished from its congeners by the two lateral thoracic stripes, which are turquoise blue in the male and greenish-yellow in the female and teneral male. Males have beautiful blue eyes and reddish-brown dorsal markings on the middle segments of the abdomen, while in the opposite sex, the abdominal markings are yellow.

A. immaculifrons has been recorded mainly in hills and mountains where it inhabits streams with still water sections and pools as well as tanks and lakes. Most of the species' records are concentrated in the periods March-May and August-October.

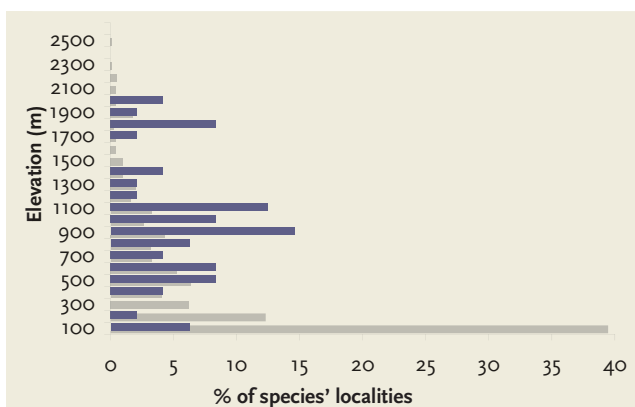
The female is most often seen when ovipositing—she inserts her eggs into plant material under the water, working her way down the plant until she is almost fully submerged. The male hovers nearby to keep rivals away until she has laid all her eggs. The larvae are bottom dwellers when young and in the early instars, they have whitish bands which appear to give them good camouflage. The later instars lose the banding and now feed among the water weeds. The exuvia of *A. immaculifrons* has been described from Sri Lanka by LIEFTINCK (1940).

This magnificent species has a very wide distribution from Greece and Turkey in the west, through India and Nepal to Hong Kong and Thailand in the east.



Number of all localities: **50** after 1990: **38**

Number of all records: **67** after 1990: **53**





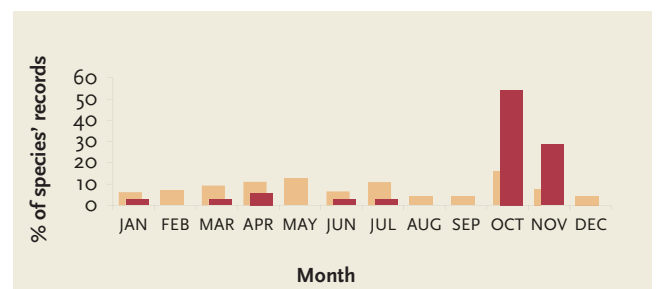
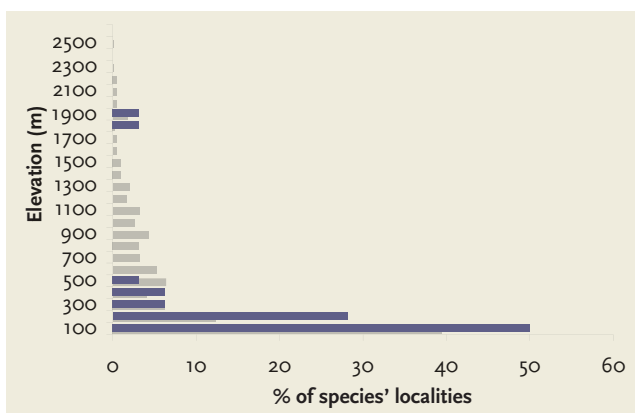
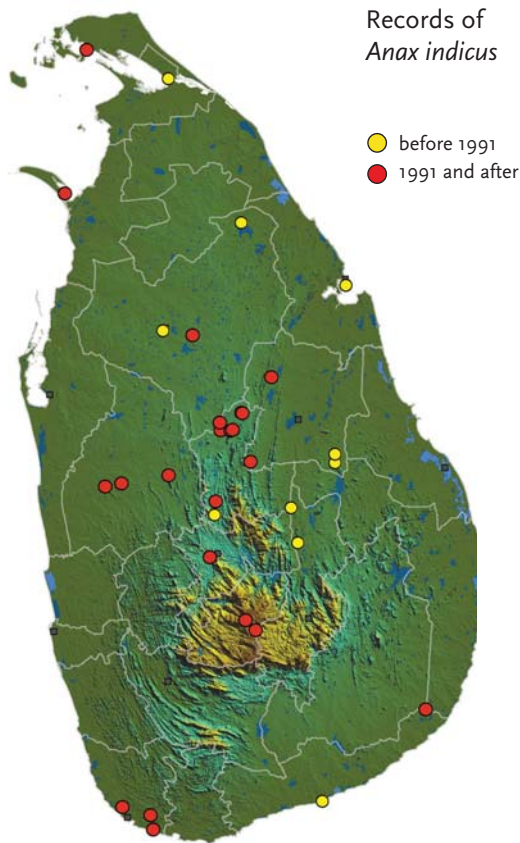
Anax indicus Lieftinck, 1942

Elephant Emperor

A charming mix of grass green, sky blue, orange-yellow and deep dark brown colours characterizes *Anax indicus*. It is interesting that this handsome Emperor was long hidden in museum series of the more widespread *A. guttatus* until LIEFTINCK (1942) finally recognized it as a separate new species. According to LIEFTINCK (1955), both sexes of *A. indicus* can be distinguished from *A. guttatus* by the absence of a dark spot adjacent to the membranula of the hind wings and by the different shape of the anal appendages. Additionally, the yellow pattern on the abdomen is clearly more intensive and the lateral spots are larger and fused on the last abdominal segments in *A. indicus*, ensuring rather easy separation of both species even when in flight.

Recent records indicate that it is widespread over tanks and lakes in the dry lowlands of the island, but most probably still under-recorded. In this respect also, its putative seasonality might play a role, with the majority of observations concentrated in October and November. Isolated mountain records of *A. indicus* from Hakgala and Nuwara Eliya (DE SILVA WIJYERATNE, 2012) are merely rare exceptions from the firm lowland character of this beautiful Emperor.

Apart from Sri Lanka, the species has so far also been recorded from India, Nepal, Pakistan, Thailand and Hong Kong.



Number of all localities: 33

after 1990: 22

Number of all records: 42

after 1990: 30

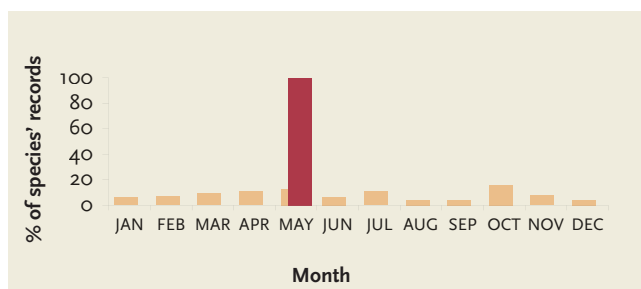
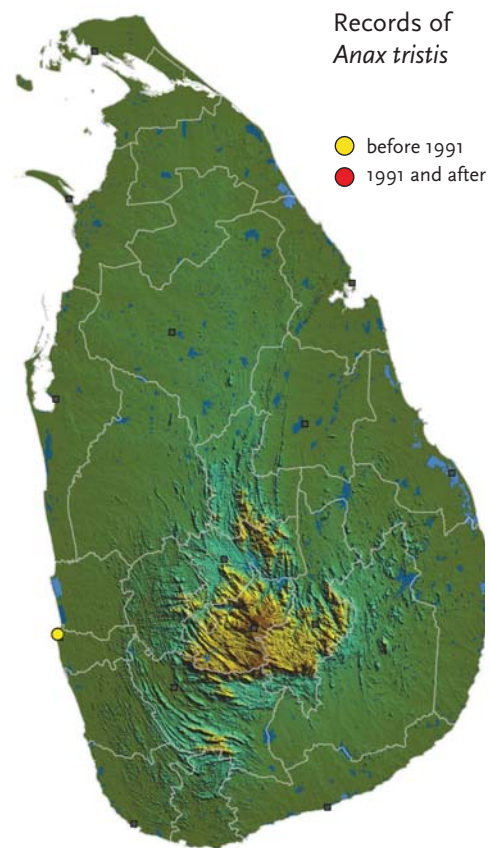
Anax tristis Hagen, 1867

Black Emperor

Among the vagrants which have been incidentally recorded in Sri Lanka belongs the impressive Emperor dragonfly *Anax tristis*. It is the largest of the Emperors, and has a characteristically very long abdomen and dark body. It is widespread throughout tropical Africa and Madagascar but it has vagabond habits and, among others, has been recorded as far east as the Maldives.

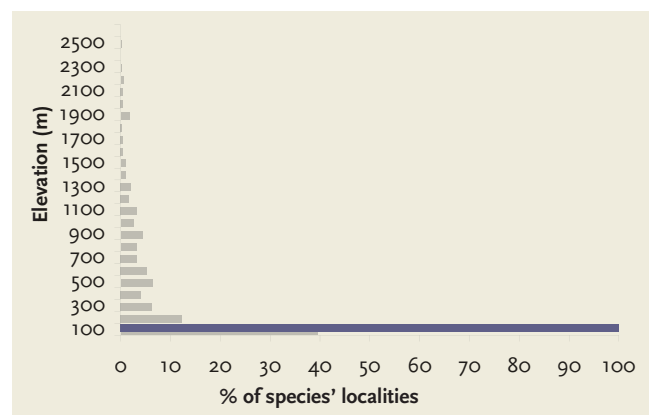
Long forgotten, a single male specimen of the species was found in the dragonfly collection of the Naturalis Biodiversity Center in Leiden in the Netherlands by the renowned young odonatologist K.-D. B. Dijkstra—it is the only proof of the species' eastwards journey to Sri Lanka almost a century ago. The data on the enclosed labels read as follows: "Ceylon, Colombo, May 1928, P. Buitendijk [leg.]; det. M. A. Lieftinck 1973".

It is not excluded that here and there another vagrant insect will be found in the coastal regions of Sri Lanka and a very large, dark Emperor always deserves the special attention of photographers. From a faunistic point of view such records are interesting curiosities but without relevance for nature conservation.



Number of all localities: 1 after 1990: ○

Number of all records: 1 after 1990: ○





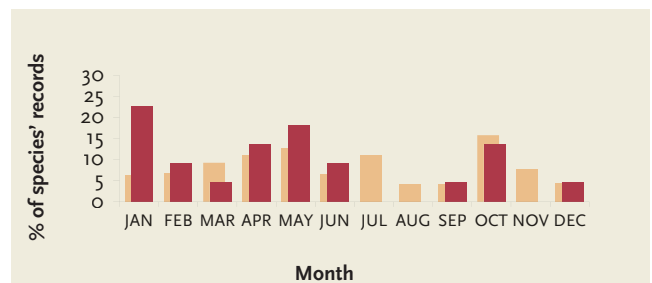
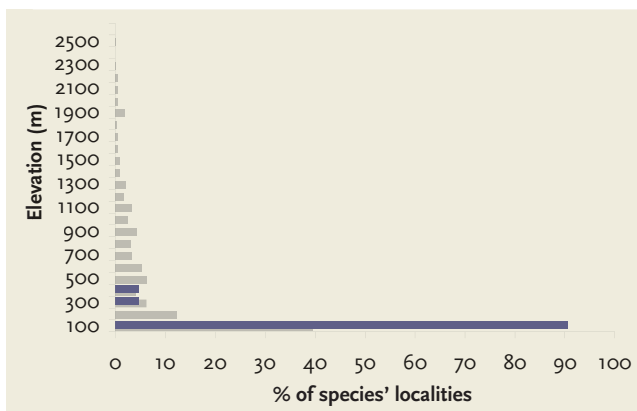
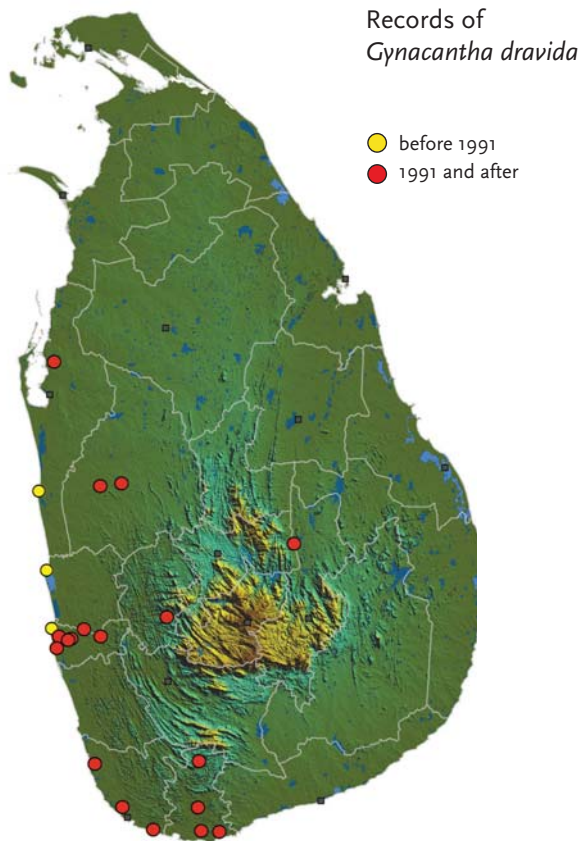
Gynacantha dravida Lieftinck, 1960

Indian Duskhawker

Although the presence of a *Gynacantha* species in Sri Lanka has been known for almost 150 years, a lot of confusion surrounded its exact identity and it was reported in the literature as *G. subinterrupta*, *G. furcata*, *G. hyalina* or simply *Gynacantha* spec. indet. (HAGEN, 1858; 1859; KIRBY, 1894; LAIDLAW, 1924; LIEFTINCK 1955; 1971a; DE FONSEKA, 2000). Only in 1960, M. A. Lieftinck discovered that the Indian records of *G. hyalina* actually belong to a distinct species and described *G. dravida* (LIEFTINCK, 1960b). The Sri Lankan material also belongs to this species. Its large size, slim abdomen and greyish to dark brown colour distinguish *G. dravida* easily from other Hawkers. Younger individuals have beautiful green and blue patches of colour but older individuals are more uniformly brown. Females have very long and narrow leaf-like anal appendages which in older individuals are usually broken off.

Recent records of *Gynacantha dravida* are almost exclusively from the western coastal regions, while rare inland records come from the forests at Kithulgala and Diyadawa and from Mahiyangana.

G. dravida is a crepuscular insect, appearing at dusk around swamps and tanks. It is often found inside houses as it is attracted to lights at night. Its biology is poorly known and most probably it is commoner than indicated by the hereto collected data.



| | |
|------------------------------|----------------|
| Number of all localities: 21 | after 1990: 18 |
| Number of all records: 30 | after 1990: 27 |





GOMPHIDAE

Clubtails

Anisogomphus ceylonicus (Hagen, 1878)

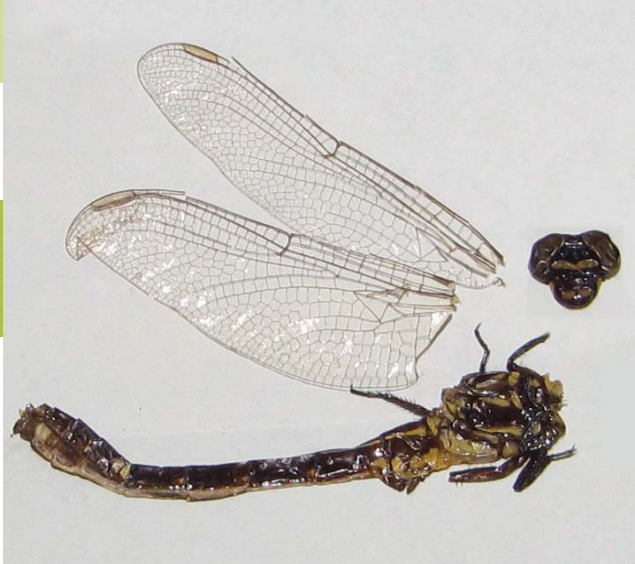
Sri Lankan Clubtail

ENDEMIC

Although Clubtails are dragonflies of moderate size and of not very swift flight, often settling down and resting on leaves of riverine vegetation, exposed twigs, stones or sandy banks of rivers, rivulets and streams, some are not easy to find due to their very specific behaviour and biology. In fact, some of them belong to the least known endemic dragonflies of Sri Lanka.

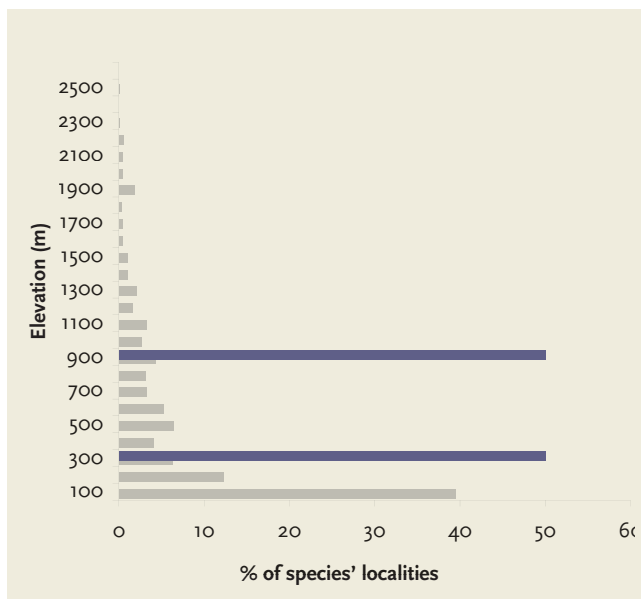
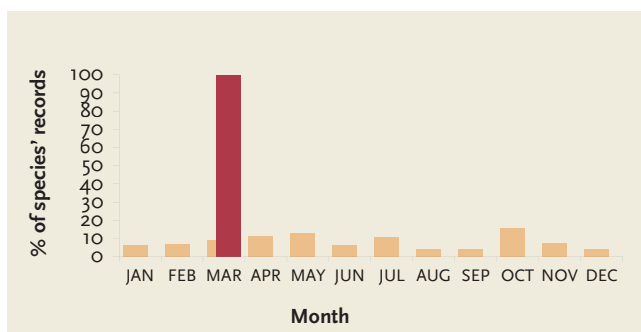
The story of two of the most enigmatic endemic Clubtail species unfolded only in the course of writing for the present book. Everything around the first, *Heliogomphus ceylonicus* (Hagen, 1878), was for a long time wrapped in a thick shroud of mystery, without any information apart from the original description and a single specimen of a female that was collected at Rambodde over 130 years ago (SELYS, 1878). Similarly, *Anisogomphus solitaris* Liefstinck, 1971 was known only from the immature male holotype and its exuvia, collected in March 1962 in Rambukpath Oya, 10 miles northwest of Hatton (LIEFTINCK, 1971a) and had not been seen for over 50 years thereafter. Only in May 2013, by comparing photos of type material, it was unexpectedly discovered that the female of *H. ceylonicus* did not belong to the genus *Heliogomphus* and that it is actually conspecific with *A. solitaris*. The former species name used by Liefstinck thus fell under synonymy and the name of *A. ceylonicus* came into formal existence (BEDJANIĆ & VAN DER POORTEN, 2013).

Of course, this enlightenment doesn't change the view of LIEFTINCK (1971a) that the species is taxonomically isolated and that due to the considerable deviation in adult and larval characters it may even belong to a new genus. Regardless of its future taxonomic position, its characteristic wing venation, predominantly black prothorax with pyriform dorsal yellow spot and well-interrupted broad mesothoracic collar will serve in the field or photo determination of ambiguous Sri Lankan Clubtails.



So far the only known precise locality of *A. ceylonicus* has been described as a stream in a steep ravine with bush and some indigenous vegetation, and the surroundings covered with tea and rubber plantations, while the forest was cut and rubber planted at higher altitudes (BRINCK et al., 1971). In the past few years, the area has been visited unsuccessfully, without any sight of the species' presence. In any case, although the landscape is quite destroyed there, the broader surroundings of the type locality still seem to fit the decades old description.

A. ceylonicus is obviously a quite rare species and it might already be extinct due to habitat degradation or pollution. However, since it is obviously not a jungle species it is more probable that the odonatological fieldwork timing and methods have not been appropriate so far. Therefore, the IUCN category proposed by BEDJANIĆ (2006a) for each of both taxa now recognized to be conspecific, still seems to be the most appropriate. Thus, endemic *A. ceylonicus* is ranked as Critically Endangered among globally threatened dragonfly species.

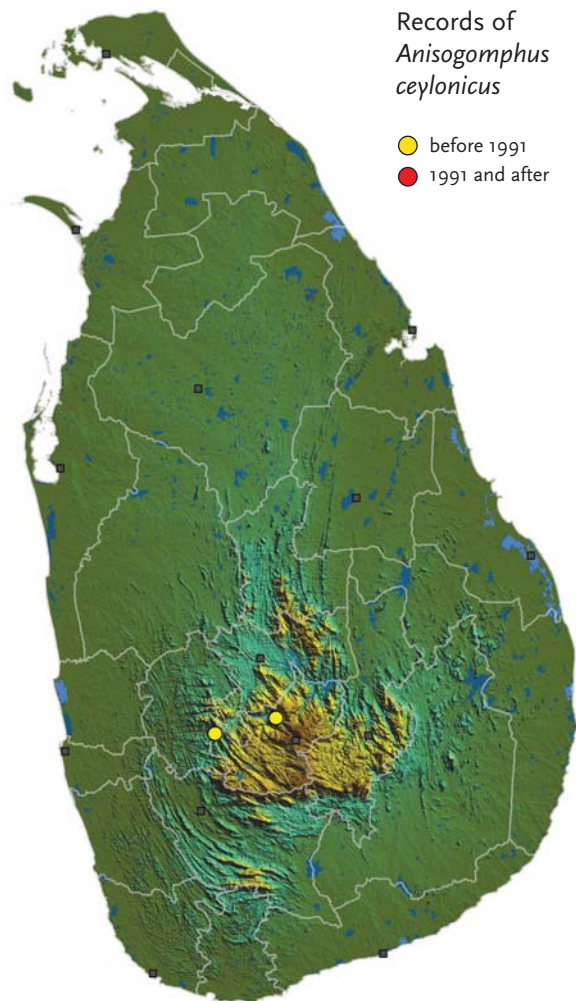


Number of all localities: 2 after 1990: 0

Number of all records: 2 after 1990: 0

% of records per period:

1850-1920 1921-1990 1991-2013



Extent of Occurrence (EOO): 8 km²

Area of Occupancy (AOO): 8 km²

IUCN Red List Criteria: CR B1ab(ii,iii)+2ab(ii,iii)

IUCN Red List Category: CRITICALLY ENDANGERED

References & Synonymy:

Gomphus ? ceylonicus, Hagen in Selys, 1878, Bull. Acad. r. Belg. (2) 46: 455.

Gomphus ? ceylonicus - SELYS (1878): 455; WILLIAMSON (1907): 305; LAIDLAW (1922): 398; *Aeshna ceylonica* - KIRBY (1890): 68; KIRBY (1894): 557; *Gomphus ceylonicus* - FRASER (1923a): 62; FRASER (1923b): 330; BRIDGES (1994): VII.47; *Gomphus ? ceylanicus* (sic!) - LAIDLAW (1924): 342; *Heliogomphus ceylonicus* - FRASER (1925): 849-850, pl. I, fig. 5; LAIDLAW (1930): 181; Needham (1932): 220; FRASER (1933d): 20, 32-33; FRASER (1934): 324, 330-331; LAIDLAW (1951): 80; LIEFTINCK (1955): 83; FERNANDO (1964): 191; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1985): 31; TSUDA (1986): 90, 221; FERNANDO (1990): 187; BRIDGES (1994): VII.47; BEDJANIĆ (1998): 9, 38-39, 59, 63, 67, 68, 73, 77; DE FONSEKA (2000): 13, 113-116; IUCN SRI LANKA (2000): 26; BEDJANIĆ (2001): 10; BEDJANIĆ (2002): 14; BEDJANIĆ (2004): 282, 284, 288-289; BEDJANIĆ (2006a): www.iucnredlist.org; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 22-23, 25; BEDJANIĆ et al. (2007): 17; IUCN SRI LANKA & MOENR (2007): 46; BEDJANIĆ (2009b): www.iucnredlist.org; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 7; *Anisogomphus solitaris* - LIEFTINCK (1971a): 198-202, 206, figs. 5, 9a-d; LIEFTINCK (1971b): 130; FERNANDO (1974): 66; GEIJSKES & KIAUTA (1984): 29; DAVIES & TOBIN (1985): 23; TSUDA (1986): 81, 220; FERNANDO (1990): 260; VAN TOL (1992): 210-211; BRIDGES (1994): VII.220; BEDJANIĆ (1998): 10, 38, 59, 63, 65, 67, 77; DE FONSEKA (2000): 13, 106-107, 209, 236-238, 266, figs. B63, C26: 1-4; IUCN SRI LANKA (2000): 26; BEDJANIĆ (2001): 10; BEDJANIĆ (2004): 281, 284, 288-289; BEDJANIĆ (2006a): www.iucnredlist.org; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 22-23, 25; BEDJANIĆ et al. (2007): 17; IUCN SRI LANKA & MOENR (2007): 46; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 7; *Anisogomphus ceylonicus* [comb. nov.; syn. *Anisogomphus solitaris* Lieftinck, 1971] – BEDJANIĆ & VAN DER POORTEN (2013): 44-47, figs. 1-8;

Faunistic records: APPENDIX 2, page 300;

Burmagomphus pyramidalis sinuatus
Fraser, 1933

Sinuate Clubtail

ENDEMIC

Burmagomphus pyramidalis sinuatus is one of the several endemic representatives of the family Gomphidae which are closely related to the species found in southern India. Initially described as a good species by F. C. Fraser (FRASER, 1933d), it later became clear that its thoracic markings are variable and that other differences from the nominotypical *B. pyramidalis* deserve only subspecific rank (LIEFTINCK, 1940).

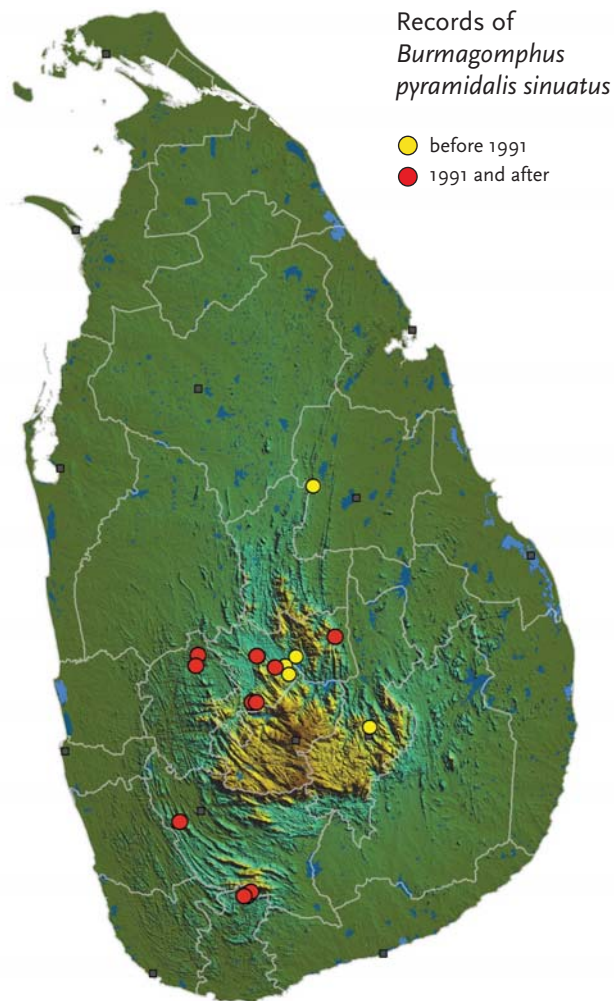
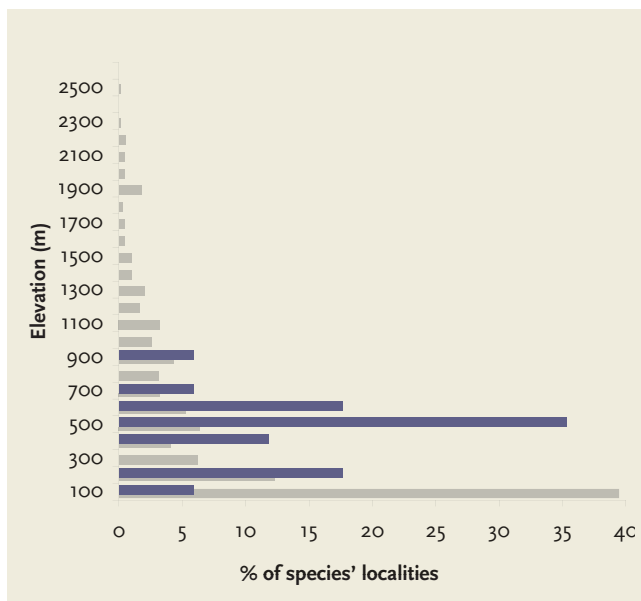
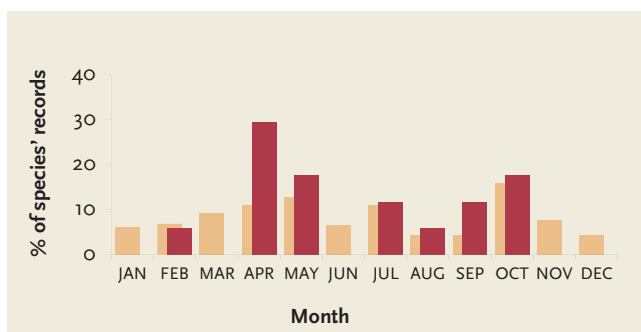
This is a medium-sized Clubtail with a narrow and cylindrical abdomen, coloured predominantly black with yellow or slightly greenish markings. Characteristic sinuate thoracic markings, the simple shape of the male's anal appendages, dark brown pterostigma, oval transverse greenish spot on the occiput between the eyes and small dorsal spines on the last abdominal segments are useful determination characters. The description of its larval form by LIEFTINCK (1940) proved to be very important in the light of its presently known distribution. This description enabled us to determine its exuviae in the field as well as in some of the larval samples and in this way to confirm not less than half of its currently known localities.

B. pyramidalis sinuatus inhabits streams, rivulets and large rivers in the lowland to midhill areas. Because larger rivulets and rivers were insufficiently



covered in the course of executed fieldwork and larval sampling was limited, its wider than presently known distribution seems quite probable. Even more so due to the fact that it has been recently discovered also in the southeastern part of the island, e.g. in Deniyaya by Matjaž Bedjanič in April 2003 and July 2012, and near Aygama by Karen Conniff and Matjaž Bedjanič in May 2009. An old isolated record in the north comes from Giritale Forest Reserve (LIEFTINCK, 1971a), and the most southeastern record originates from Dunhinda Falls near Badulla where *B. pyramidalis sinuatus* was recorded four decades ago in the course of the Smithsonian Insect Project in Sri Lanka.

So far the threat status of *B. pyramidalis sinuatus* has not been assessed on the global level, however, VAN DER POORTEN & CONNIFF (2012) listed it as nationally Critically Endangered. New data show that this luckily might be too pessimistic so the species is proposed to be included in the IUCN category of Vulnerable.



| | |
|------------------------------|----------------|
| Number of all localities: 17 | after 1990: 12 |
| Number of all records: 17 | after 1990: 12 |

| |
|---|
| Extent of Occurrence (EOO): 8,350 km ² |
| Area of Occupancy (AOO): 64 km ² |

% of records per period:

| | | |
|-----------|-----------|-----------|
| 1850-1920 | 1921-1990 | 1991-2013 |
| 29 | | 71 |

IUCN Red List Criteria: VU B1ab(iii)+2ab(iii)

IUCN Red List Category: VULNERABLE

References & Synonymy:

Burmagomphus sinuatus, Fraser, 1933, Ceylon J. Sci. (B) 18(1): 20, 33-35, fig. 6.

Burmagomphus sinuatus - FRASER (1933d): 20, 33-35, fig. 6; FRASER (1934): 213, 219-220, fig. 68; *Burmagomphus pyramidalis sinuatus* - LIEFTINCK (1940): 81, 104-112, figs. 7-9, pl. I-fig. 3; LAIDLAW (1951): 80; LIEFTINCK (1955): 83; FERNANDO (1964): 191; LIEFTINCK (1971a): 202, 206; LIEFTINCK (1971b): 113; DAVIES & TOBIN (1985): 25; TSUDA (1986): 84, 221; FERNANDO (1990): 187; VAN TOL (1992): 210; BRIDGES (1994): VII.219; BEDJANIĆ (1998): 9-10, 38, 59, 63, 65, 67, 77; DE FONSEKA (2000): 13, 107-109, 209-210, 236, 238-239, 266, 269, figs. B64, B68a-c, C27:1-2, C34:3; BEDJANIĆ (2004): 284, 288; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2007): 17, 116-117; *Burmagomphus pyramidalis* - IUCN SRI LANKA (2000): 26; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 7;

Faunistic records: APPENDIX 2, page 301;

Cyclogomphus gynostylus Fraser, 1926

Transvestite Clubtail

ENDEMIC

The curious anal appendages of the male are a trademark of *Cyclogomphus gynostylus*, responsible for its Latin as well as slightly roguish English name. The superiors are especially structurally aberrant and unlike anything seen amongst other Sri Lankan Clubtails, with some imagination resembling an upturned female ovipositor in lateral view. Also the lobe of the male's penis on the ventral side of the second abdominal segment is very peculiar, forming a large rounded bulb that shows prominently from the side.

Both sexes of *C. gynostylus* are quite alike in colouration and markings with two distinct V or Y shaped black markings on the sides of the yellow thorax. The abdomen is predominantly black with bright yellow markings and laterally expanded on the last segments. The pterostigma is light grayish in young individuals, while at least in mature females, it is bicolourous, being brown in the middle and grayish on the sides.

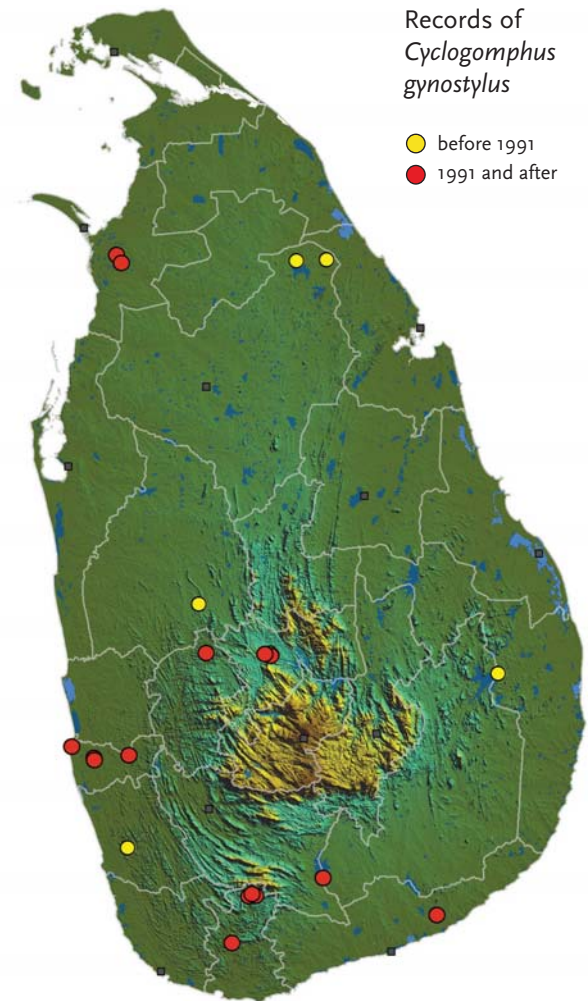
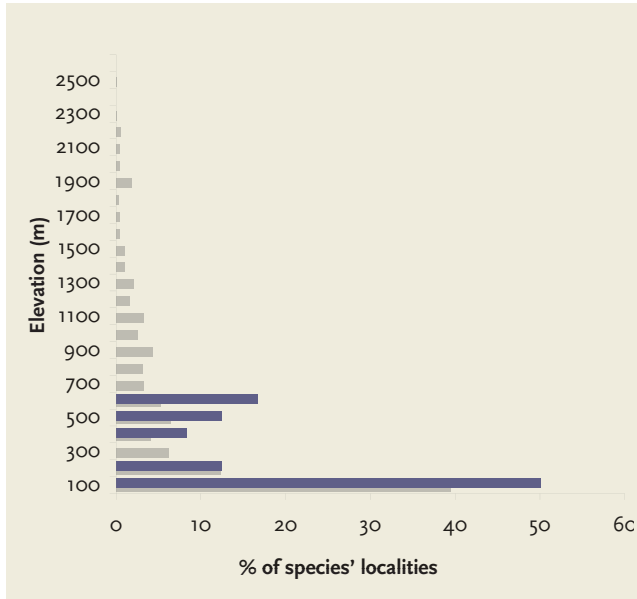
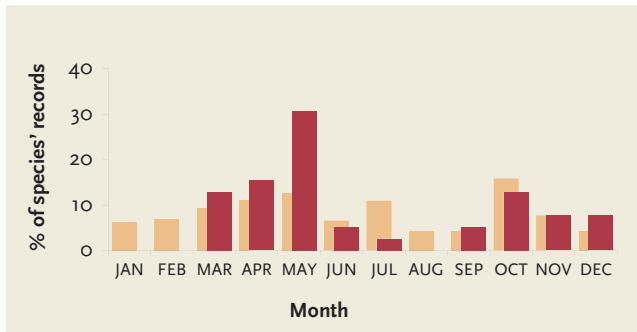
Published records for *C. gynostylus* are very scarce and it has been labeled as rare (FRASER, 1926b; 1933d; 1934; LIEFTINCK, 1955; BEDJANIĆ, 2006a; BEDJANIĆ et al., 2007; LANKIKA et al., 2012). However, by reviewing data from past literature, unpublished records of the researchers of the Smithsonian Institution, and recently collected field data and photographs, its distribution picture slowly gains contours. From the north there are two older records from the vicinity of Padaviya and recent sightings from the surroundings of Giant's Tank. Southwards there are some records scattered around Colombo, and towards the interior of the island there are additional records from Kurunegala and Maha Oya at Pinnawala. In the central part of the island the species is well known from Kandy and its surroundings since the time of F. C. Fraser and it has also been found here several times in the last few decades. An isolated eastern



record comes from Inginiyagala, while in the south, recent observations of the species are known from Deniyaya, Nilwala river north of Akuressa, Uda Walawe and Tissamaharama.

This small Clubtail is not a vigorous flyer, and is easy to overlook as it lives along grassy edges of irrigation canals, drains, slow moving waterways and lakes, where it sits on tall grasses and other low shrubs. The species is found from the lowlands to the mid-hills. The main flight season of the adults seems to be from March to May and October to December. Its biology and behaviour are only poorly studied. Despite the fact that larvae and exuviae have been found, these stages have not been formally described yet.

Since the species obviously manages to survive in open landscapes and in a variety of habitats, the status of Critically Endangered species on the national Red List (VAN DER POORTEN & CONNIFF, 2012) is probably too rigorous in estimating the odds of the species' survival in future decades. However, on the global level, its threat status of Vulnerable species as assessed by BEDJANIĆ (2006a) still remains unchanged.



Number of all localities: **24** after 1990: **16**

Number of all records: **37** after 1990: **27**

Extent of Occurrence (EOO): **41,608 km²**

Area of Occupancy (AOO): **84 km²**

% of records per period:

1850-1920 1921-1990 1991-2013

3 24 73

IUCN Red List Criteria: VU B1ab(iii)+2ab(iii)

IUCN Red List Category: VULNERABLE

References & Synonymy:

Cyclogomphus gynostylus, Fraser, 1926, J. Bombay Nat. His. Soc. 31: 162.

Cyclogomphus heterostylus - LAIDLAW (1924): 341; *Cyclogomphus gynostylus* - FRASER (1925): 854; FRASER (1926b): 162-163; LAIDLAW (1930): 186; FRASER (1933d): 20, 26, 36, fig. 3; FRASER (1934): 179, 185-187, fig. 58; LAIDLAW (1951): 80; LIEFTINCK (1955): 83; FERNANDO (1964): 191; KIMMINS (1966): 194; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1985): 26; TSUDA (1986): 85, 221; FERNANDO (1990): 187; VAN TOL (1992): 116; BRIDGES (1994): VII.103; BEDJANIĆ (1998): 9, 38, 59, 63, 65, 67, 77; DE FONSEKA (2000): 13, 109-110, 209, figs. B66a-c; IUCN SRI LANKA (2000): 26; BEDJANIĆ (2001): 10; BEDJANIĆ (2004): 281, 284, 288-289; BEDJANIĆ (2006a): www.iucnredlist.org; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 22-23, 25; BEDJANIĆ et al. (2006): pl. 9; BEDJANIĆ et al. (2007): 17, 118-119; IUCN SRI LANKA & MOENR (2007): 46; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 1, 7;

Faunistic records: APPENDIX 2, page 301;

Heliogomphus lyratus Fraser, 1933

Lyrate Grappletail

ENDEMIC

In his work “*The Gomphines of Ceylon*”, which counts among the classics in the odonatological bibliography of Sri Lanka, F. C. Fraser enumerated four endemic Grappletail species. The story of the first described “*Heliogomphus*” *ceylonicus* has been unveiled on previous pages, while among the remaining three endemics of the island, *Heliogomphus lyratus* was the last named and described in the above account (FRASER, 1933d).

The male of *H. lyratus* is easily recognized by the lyrate shape of its superior anal appendages, which bear a peculiar, straight outwardly directed robust and sharp lateral spine. Species-specific yellow thoracic markings are quite alike in both sexes, with a narrow mesothoracic collar, quite short, narrow and anteriorly divergent humeral stripes and with the black stripes along the lateral sutures interconnected in the upper part, forming an isolated yellow spot below the wings.

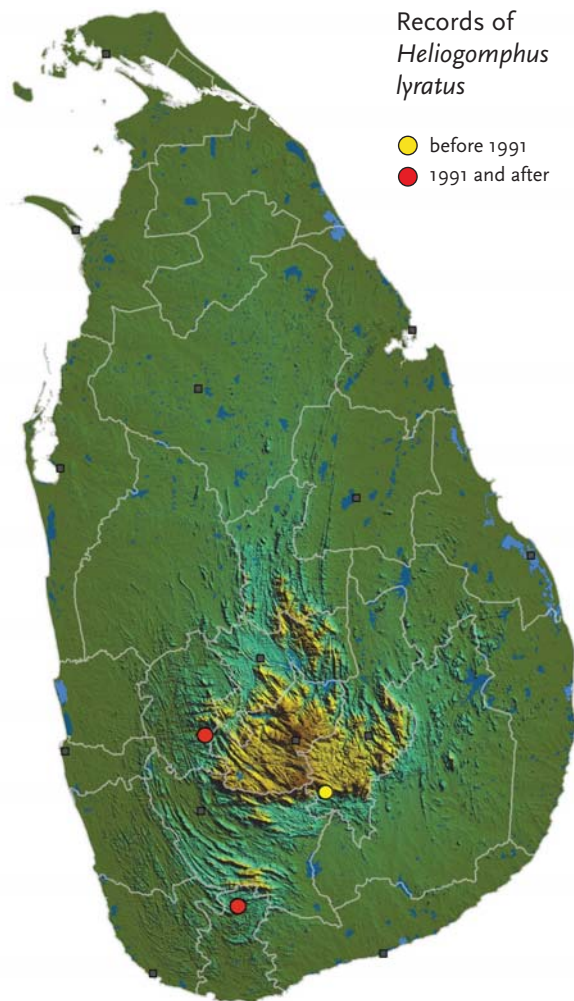
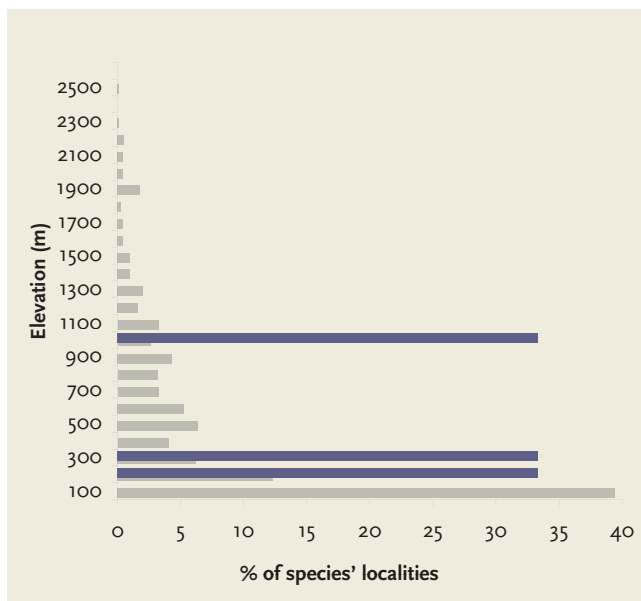
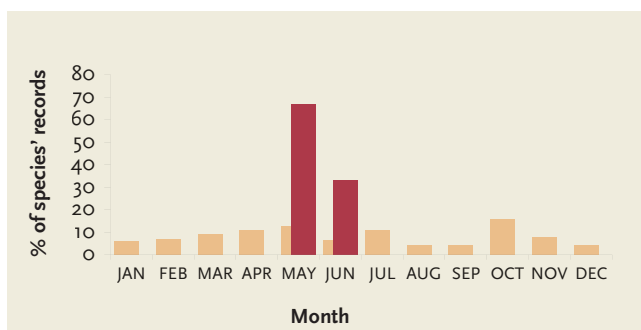
For over 80 years the original description of a single male and female, collected at Haldummulla in June 1926 by G. M. Henry, was the sole available information on the species. Only in May 2009, Matjaž Bedjanič recorded a male along a small stream in the secondary forest near Kithulgala and a female in a stream on the Morawaka-Diyadawa road on the slopes of Diyadawa forest.

Almost nothing is known on the biology and habitat preferences of *H. lyratus*. The sole male was found settled in a typical *Heliogomphus* manner on a leaf along a small stream at the forest edge, while the female was caught with a camera while fiercely



ovipositing in a small, shallow, stony stream in well-shaded forest. Both recent observations fit into the generally known habitat preferences of Grappletails. However, even though similar places were the focus of the odonatological fieldwork supported by the Rufford Foundation in 2012, no new records were added. One of the reasons why observations of this species are so scarce might be the actual rarity of *H. lyratus*, probably even more pronounced in the last few decades by the destruction of habitats and the conversion of vast areas of the island's interior into green deserts of tea and other crops. Another reason might be its apparent strong seasonality.

Nothing other than further targeted fieldwork, also focused on larval sampling, can answer these questions and give better insight into the current distribution and threat status of *H. lyratus*. Until then, the species retains its current position among globally endangered dragonflies, and its rank of Critically Endangered species as assessed by BEDJANIČ (2006a) remains unchanged as well.



Number of all localities: 3 after 1990: 2

Number of all records: 3 after 1990: 2

Extent of Occurrence (EOO): 1,769 km²

Area of Occupancy (AOO): 12 km²

% of records per period:

1850-1920 1921-1990 1991-2013

33

67

IUCN Red List Criteria: CR B1ab(ii,iii)+2ab(ii,iii)

IUCN Red List Category: CRITICALLY ENDANGERED

References & Synonymy:

Heliogomphus lyratus, Fraser, 1933, Ceylon J. Sci. (B) 18(1): 20, 31-32, figs. 4a, 5b.

Heliogomphus lyratus - FRASER (1933d): 20, 31-32, figs. 4a, 5b; FRASER (1934): 325, 333-334, fig. 102b; LAIDLAW (1951): 80; LIEFTINCK (1955): 83; FERNANDO (1964): 191; KIMMINS (1966): 225; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1985): 31; TSUDA (1986): 90, 221; FERNANDO (1990): 187; BRIDGES (1994): VII.140; IUCN SRI LANKA (2000): 26; BEDJANIĆ (1998): 9, 39, 59, 63, 67, 77; DE FONSEKA (2000): 13, 114, 116-117, 283, figs. B72b, B73b; BEDJANIĆ (2002): 14; BEDJANIĆ (2004): 284, 288-289; BEDJANIĆ (2006a): www.iucnredlist.org; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23, 25; BEDJANIĆ et al. (2007): 17; IUCN SRI LANKA & MOENR (2007): 46; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 7;

Faunistic records: APPENDIX 2, page 301;

Heliogomphus nietneri (Hagen, 1878)

Nietner's Grappletail

ENDEMIC



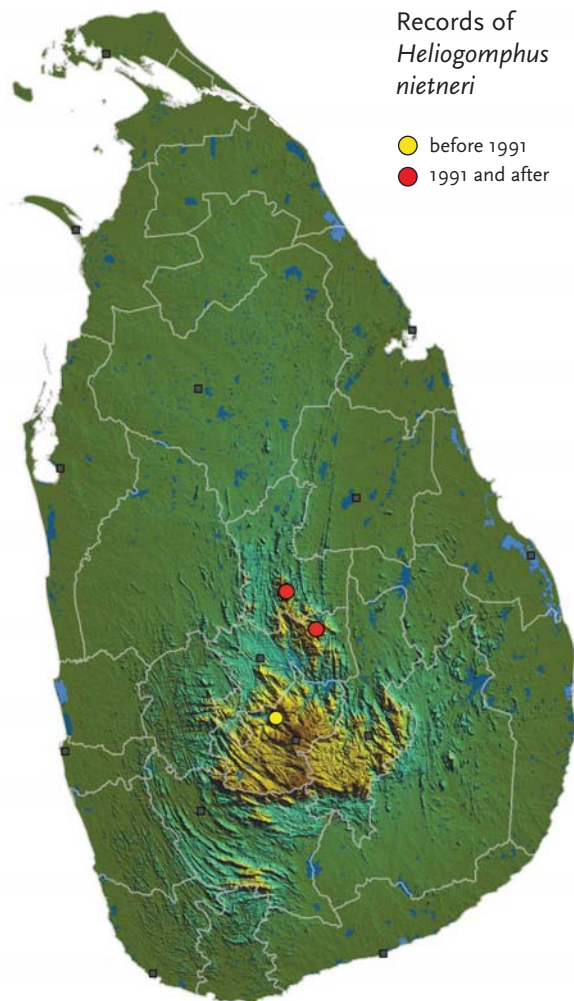
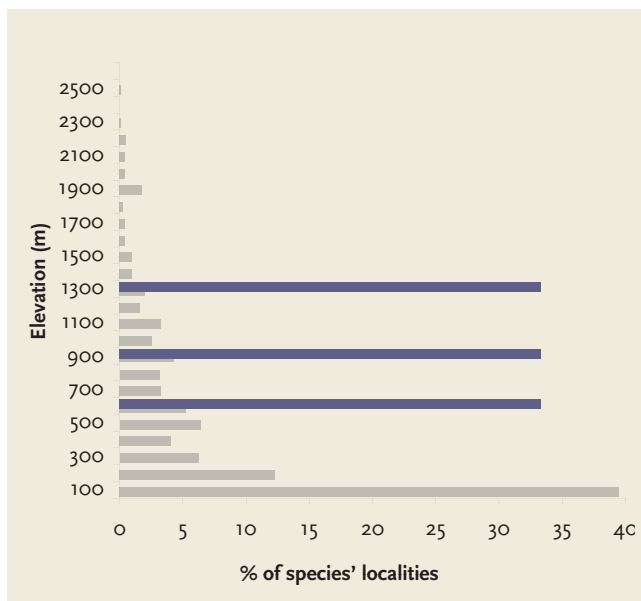
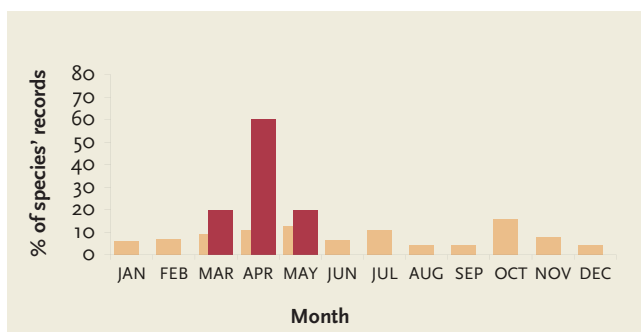
For over 120 years known only from a single original record from Rambodde (HAGEN *in* SELYS, 1878), *Heliogomphus nietneri* is one of the least known dragonflies of Sri Lanka. It is confined to the island, and old listings of the species from Burma (SELYS, 1891) and Assam (LAIDLAW, 1922; 1924) actually all belong to a different species later described as *Heliogomphus selysi* (FRASER, 1925; 1934).

Only in April 2005 the species was surprisingly rediscovered by Nancy van der Poorten at two localities in the Knuckles, with additional sightings in May 2006 and March 2010. Males and females were photographed at waterfalls on the Rattota-Illukumbara road and near Meemure, where they perched on rocks and mating has been observed as well.

Superficially, *H. nietneri* looks similar to the other two endemic Grappletails but can be distinguished by the thoracic and abdominal markings and by the shape of the male's anal appendages. The yellow markings on the mesothoracic collar and

the antehumeral stripe are more slender and the yellowish abdominal markings are much more restricted than in its congeners. The superior anal appendages of the male, viewed from above, are creamy white with brown tips and with the outer margin straight but then curved inward at nearly a right angle (FRASER, 1942). The female of *H. nietneri* has not been described yet and the larval stage is unknown. As for all of the island's Grappletails, correctly determined records of larvae and exuviae could greatly expand the knowledge on biology and distribution, so larval sampling and descriptions should be among priority fieldwork tasks for the future.

Although new data on species' occurrences in the Knuckles are encouraging, due to its still very small range, the species is assessed as nationally (VAN DER POORTEN & CONNIFF, 2012) and globally threatened (BEDJANIČ, 2006a). Its rank of Critically Endangered species according to IUCN criteria remains unchanged.



| | |
|-----------------------------|---------------|
| Number of all localities: 3 | after 1990: 2 |
| Number of all records: 6 | after 1990: 5 |

| | |
|-----------------------------|---------------------|
| Extent of Occurrence (EOO): | 389 km ² |
| Area of Occupancy (AOO): | 12 km ² |

% of records per period:

1850-1920 1921-1990 1991-2013



IUCN Red List Criteria: CR B1ab(ii,iii)+2ab(ii,iii)

IUCN Red List Category: CRITICALLY ENDANGERED

References & Synonymy:

Gomphus ? nietneri, Selys, 1878, Bull. Acad. r. Belg. (2) 46: 449-451.

Gomphus ? nietneri - SELYS (1878): 449-451; *Anisogomphus nietneri* - KIRBY (1890): 69; KIRBY (1894): 557; *Leptogomphus nietneri* - SELYS (1891): 474-476 (pars); RIS (1912b): 69; *Leptogomphus ? nietneri* - WILLIAMSON (1907): 295; *Heliogomphus nietneri* - LAIDLAW (1922): 379 (pars); FRASER (in LAIDLAW 1922): 416 (pars); FRASER (1923a): 63; FRASER (1923b): 331; LAIDLAW (1924): 339; FRASER (1925): 847, 850; LAIDLAW (1925): 559, 560; LAIDLAW (1930): 181; NEEDHAM (1932): 220; FRASER (1933d): 19, 20, 27-29, fig. 4e; FRASER (1934): 324, 326-327, fig. 100b; LAIDLAW (1951): 80; LIEFTINCK (1955): 83; LIEFTINCK (1960a): 241; FERNANDO (1964): 191; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1985): 31; TSUDA (1986): 90, 221; FERNANDO (1990): 187; BRIDGES (1994): VII.164; BEDJANIĆ (1998): 9, 39, 59, 63, 67, 68, 73, 77; DE FONSEKA (2000): 13, 115, 117-118, 210, fig. B73c; IUCN SRI LANKA (2000): 26; BEDJANIĆ (2001): 10; BEDJANIĆ (2002): 14; BEDJANIĆ (2004): 284, 288-289; BEDJANIĆ (2006a): www.iucnredlist.org; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 22-23, 25; BEDJANIĆ et al. (2007): 17; IUCN SRI LANKA & MOENR (2007): 46; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 4, 8;

Faunistic records: APPENDIX 2, page 301-302;

Heliogomphus walli Fraser, 1925

Wall's Grappletail

ENDEMIC

Heliogomphus walli is definitely the most common and widespread of the Sri Lankan Grappletails. But it was not known to be so until recently. It is amazing how many new records have been gained for this gentle endemic in the last two decades and it is hard to believe that only three literature localities were known for the species until the break of the millennium (FRASER, 1933d; DE FONSEKA, 2000).

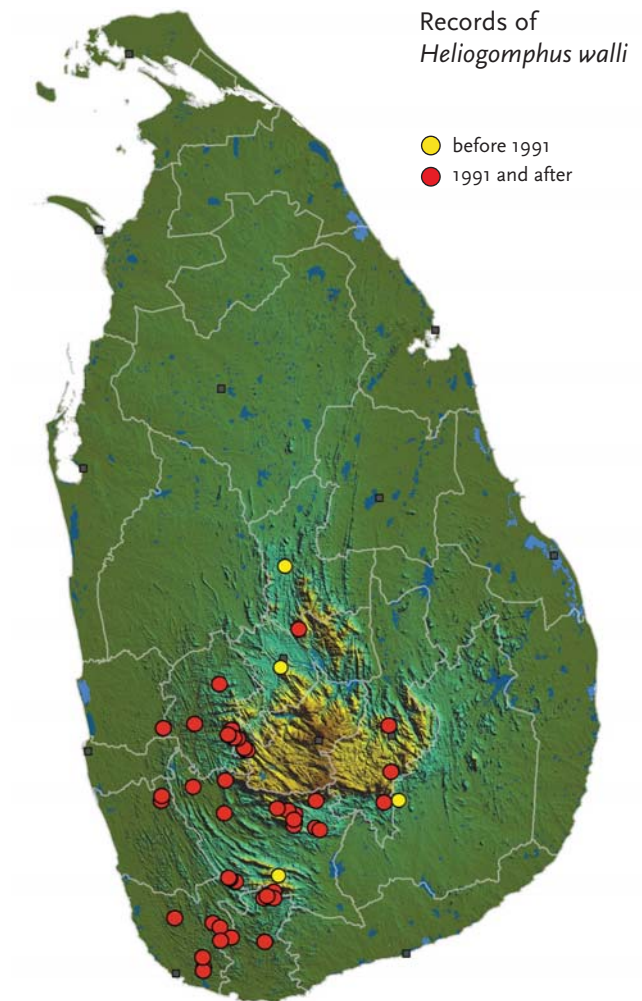
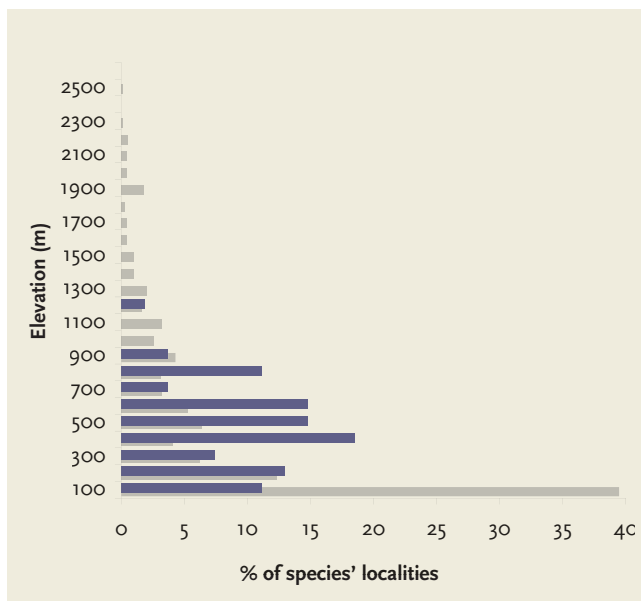
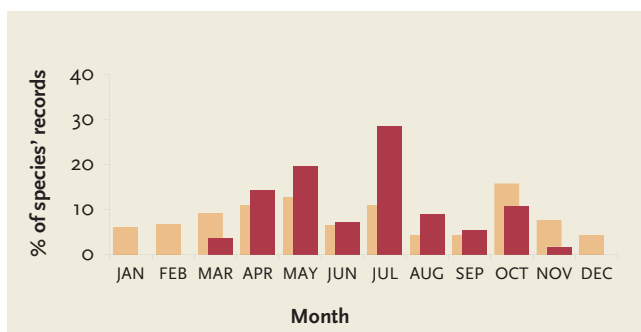
In the field, *H. walli* can be recognized by the broad yellow markings on the mesothoracic collar, the short narrowly elliptical antehumeral stripes, the sides of thorax with two narrow black stripes along the sutures and abdomen furnished with a yellow dorsal line and lateral yellow spots and lines. The anal appendages are white in both sexes; the lyrate superiors of the male are evenly curved inwards along their length, and curled at the apices, while the lateral spine is small and directed backwards.

To describe the general outlines of the species' biology, also largely valid for the preceding two congeners, a short extract from F. C. Fraser's valuable account on the genus is given in the following lines: "...The *Heliogomphines* are true jungle creatures and breed in the small tributaries of larger montane streams or often in mere seepages adjoining such streams. In this respect they resemble the *Microgomphines*, but are not given like these to rising to the neighbouring trees, preferring rather to settle on the surrounding herbage where their shagreen colouring harmonises with their surroundings and affords a certain measure of



protection..." (FRASER, 1942). In these habitat types, *H. walli* has been recorded from the lowlands to the mid-hills in the whole southwestern part of Sri Lanka, while some localities are also known from the Knuckles area and the eastern hills in the Badulla District. The adults can be met from March to November with peaks in April-May and July-August.

On the national Red List, *H. walli* is declared as an Endangered species (VAN DER POORTEN & CONNIFF, 2012). Based on the recent additions to the faunistic data, the species was not included among the globally threatened endemic species but assessed as Near Threatened according to the IUCN Red List criteria (BEDJANIĆ, 2009b). In any case, the current data do not suggest that the species is expanding recently or that the condition of its habitats is improving but can only serve as a basic comparison for monitoring population trends in the decades to come, confirming that for this endemic the applied field work methods and strategies were the right ones.



| | |
|------------------------------|----------------|
| Number of all localities: 52 | after 1990: 46 |
| Number of all records: 65 | after 1990: 59 |

| |
|--|
| Extent of Occurrence (EOO): 11,165 km ² |
| Area of Occupancy (AOO): 188 km ² |

% of records per period:

1850-1920 1921-1990 1991-2013

| | |
|---|----|
| 9 | 91 |
|---|----|

IUCN Red List Criteria: NOT APPLICABLE

IUCN Red List Category: NEAR THREATENED

References & Synonymy:

Heliogomphus walli, Fraser, 1925, J. Bombay Nat. Hist. Soc. 30: 849-851.

Heliogomphus walli - FRASER (1925): 849-851; LAIDLAW (1930): 182; NEEDHAM (1932): 220; FRASER (1933d): 20, 29-31, figs. 4b, 5a; FRASER (1934): 324, 331-333, fig.102a; LAIDLAW (1951): 80; LIEFTINCK (1955): 83; FERNANDO (1964): 191; KIMMINS (1966): 218; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1985): 31; TSUDA (1986): 90, 221; FERNANDO (1990): 187; BRIDGES (1994): VII.250; BEDJANIĆ (1998): 9, 39, 59, 63, 67, 77; DE FONSEKA (2000): 13, 115-118, 210, 283, figs. B72a, B73a; IUCN SRI LANKA (2000): 26; BEDJANIĆ (2002): 14; DE SILVA WIJEYERATNE et al. (2003): pl. 3; BEDJANIĆ (2004): 284, 288; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2006): pl. 10; BEDJANIĆ et al. (2007): 17, 124-125; WCSG (2008): 15; WCSG (2009): 14; BEDJANIĆ (2009b): www.iucnredlist.org; VAN DER POORTEN (2009b): 56; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 8;

Macrogomphus annulatus keiseri Lieftinck, 1955

Keiser's Forktail

ENDEMIC

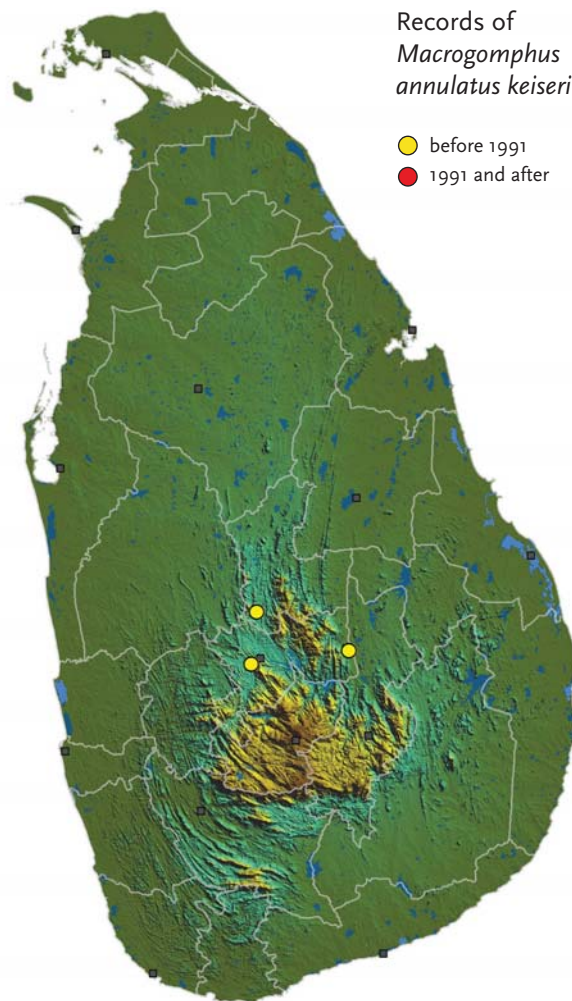
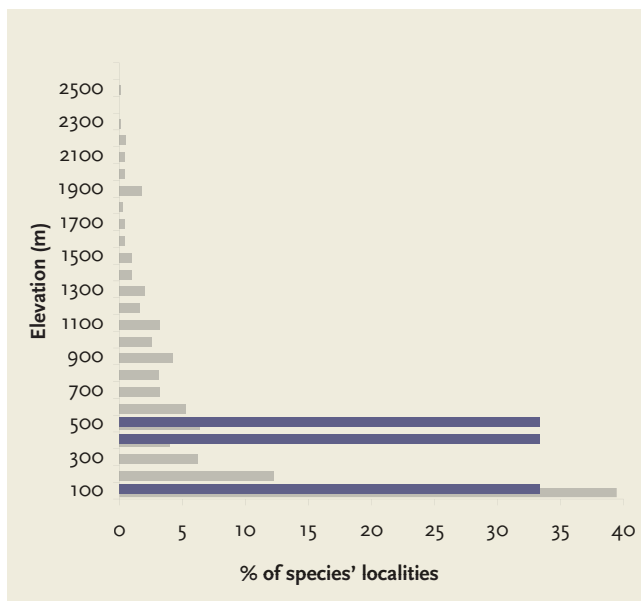
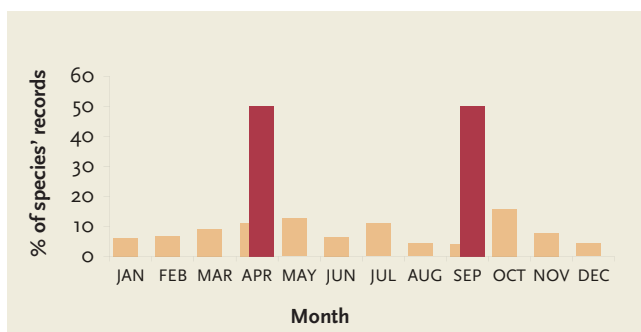
Two endemic Forktail species have so far been described from Sri Lanka. Due to their robust build, curiously prolonged ninth abdominal segment as well as the long, divaricated superior anal appendages of the males, they are easily recognizable among other Clubtails. Their larvae and exuviae are also determined at a glance due to the peculiar prolongation of the last two abdominal segments into a long tube. For the larvae, which live buried in fine silt, this tubular structure serves like a snorkel, protruding above the mud into clean water allowing the larva to breathe whilst the rest of the body is immersed in mud and sand.

An endemic insular subspecies of the Indian *Macrogomphus annulatus* was described by M. A. Lieftinck, based on material provided by the Swiss dipterologist F. Keiser, who collected a single male on 14 September 1953 at a light in Weragamtota near Mahiyangana (LIEFTINCK, 1955). It was named after its discoverer as *M. annulatus keiseri* and the original description still remains the first and only published record so far. Even fieldwork in the last decade failed to add any records. However, work in museums revealed two additional records of this enigmatic endemic. First of these comes from the Natural History Museum in London, where a single female of *M. annulatus keiseri*, labeled as “Peradeniya, Matale, Ceylon; 2-iv-1905; N. K. Jordine leg.” was discovered. Unfortunately, the last four segments of its abdomen are missing so it was not formally described. The second record of a male, originating from “Matale, 12 mi E of Naula” is the result of the Smithsonian Insect Project in Sri Lanka and was found only by browsing through M. A. Lieftinck's correspondence



and notes kept in the Naturalis Biodiversity Center in Leiden in the Netherlands. Among many other rare endemics, this specimen was lost at sea due to an unfortunate loan return accident.

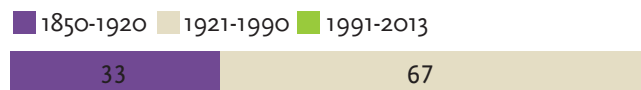
Although without any new data, it seems likely that *M. annulatus keiseri* inhabits the Mahaweli Ganga and its tributaries. As described by FRASER (1934), adults of *Macrogomphus* species are prone to leaving the parent river soon after emergence and take flight to the jungle and trees. This might be one of the reasons for its rarity, but on the other hand, extensive damage to the Mahaweli River ecosystem in the last few decades through hydropower impoundments, sand mining, water extraction and pollution has occurred. In accordance with VAN DER POORTEN & CONNIFF (2012), *M. annulatus keiseri* is assessed as a Data Deficient species. However, it is likely that it will jump to one of the IUCN threat categories as soon as new knowledge enables more sound interpretation of available data.



| | |
|-----------------------------|---------------|
| Number of all localities: 3 | after 1990: 0 |
| Number of all records: 3 | after 1990: 0 |

| | |
|-----------------------------|---------------------|
| Extent of Occurrence (EOO): | 475 km ² |
| Area of Occupancy (AOO): | 12 km ² |

% of records per period:



IUCN Red List Criteria: DD

IUCN Red List Category: DATA DEFICIENT

References & Synonymy:

Macrogomphus annulatus keiseri, Lieftinck, 1955, Zool. Meded. 34 (5): 81-83, fig. 4.

Macrogomphus annulatus keiseri - LIEFTINCK (1955): 81-83, fig. 4; FERNANDO (1964): 191; LIEFTINCK (1971a): 206; LIEFTINCK (1971b): 126; GEIJSKES & KIAUTA (1984): 29; TSUDA (1986): 93, 222; FERNANDO (1990): 187; BEDJANIĆ (1998): 10, 40, 59, 63, 65, 67, 77; DE FONSEKA (2000): 13, 120, 211, 240, fig. B75; BEDJANIĆ (2004): 284, 288; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2007): 17; *Macrogomphus lankanensis* (sic!) *keiseri* - DAVIES & TOBIN (1985): 33; VAN TOL (1992): 132; *Macrogomphus keiseri* - TSUDA (1986): 93, 222; BRIDGES (1994): VII.124; *Macrogomphus annulatus* - IUCN SRI LANKA (2000): 26; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 8;

Faunistic records: APPENDIX 2, page 302;

Macrogomphus lankanensis Fraser, 1933

Sri Lankan Forktail

ENDEMIC

Smaller size, creamy yellow colour and the different shape of the forked superior anal appendages of the male as well as widely separated yellow lateral spots instead of rings on the third to sixth abdominal segments are useful characters in distinguishing *Macrogomphus lankanensis* from its more robust congener.

Before the first photo of a live insect, taken by Karen Conniff in Talangama wetland just outside Colombo in 2005, the species was very poorly known with only two old published records from Murunkan in the north and Haragama in the central part of Sri Lanka (FRASER, 1933d; 1934). There were also some scattered unpublished records from the vicinity of Vavuniya, Anuradhapura, Kandy and Kottawa Forest Reserve in the collection of the Smithsonian Institution, obtained between 1970 and 1975 by Oliver Flint, Karl Krombein and other researchers in the course of their insect research project in Sri Lanka. Still the localities were very scattered and no data existed on the ecological preferences of the species. Only in the last five or six years has our knowledge on the species' distribution expanded considerably, starting with interesting observations of a female and of mating by Amila Salgado in his backyard in Bomiriya east of Colombo and by the listing of almost a dozen new localities in the Galle and Matara districts by the members of Galle Wildlife Conservation Society, particularly through the fieldwork of Sampath Gunasinghe (WCSG, 2008; 2009).

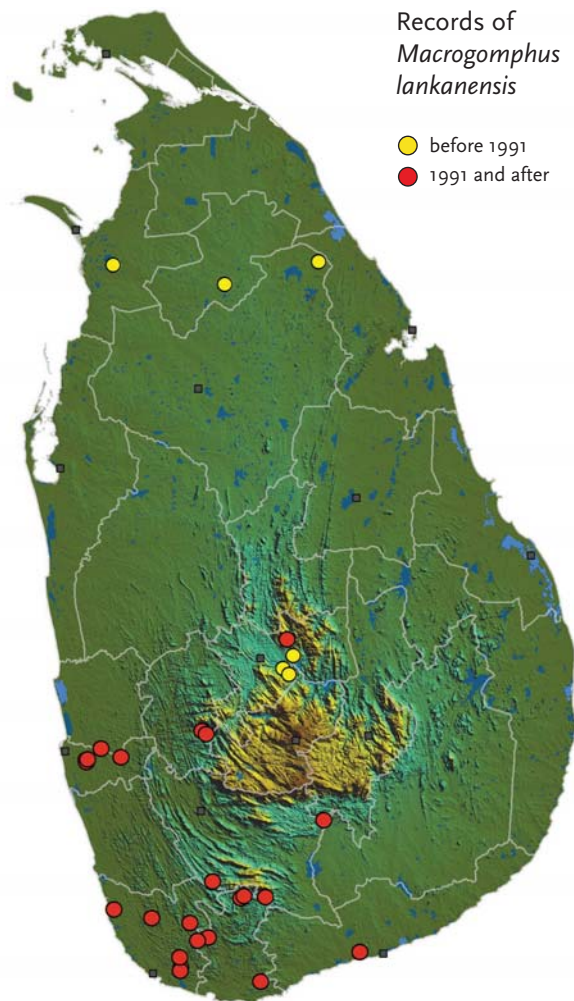
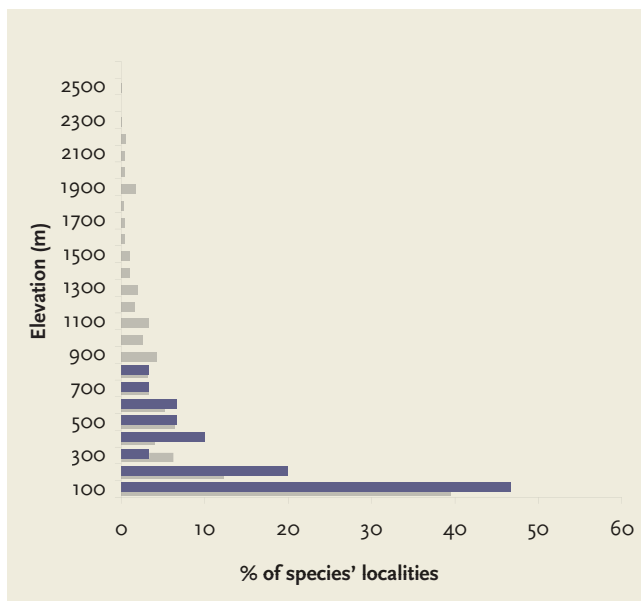
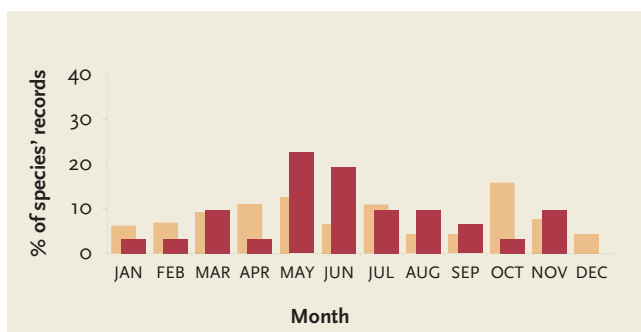
Up to now, the species has been found in different habitats, from the lowlands to the mid-hills along slow moving streams, canals and rivulets. Just outside Colombo it was found at the same locality



as *Cyclogomphus gynostylus* on an irrigation canal. The peak of its flight season seems to be in May and June, although it can be seen throughout the year. Usually, only solitary individuals of *M. lankanensis* are observed and any data on actual population sizes are lacking.

Still very little is known of the species' life cycle and although there are good records of the size and shape of the exuviae it has not been described yet. According to FRASER (1933d, 1934) the female also remains undescribed, even though the brief description of LAIDLAW (1924) actually relates to the female of *M. lankanensis*.

BEDJANIČ (2006a, 2009b) assessed *M. lankanensis* as a globally threatened Vulnerable species. Since then, however, a lot of new records have become available, but until the widely isolated old northern records are confirmed and this part of the island is adequately surveyed for the species' presence, the mentioned IUCN category of *M. lankanensis* remains unchanged.



| | |
|------------------------------|----------------|
| Number of all localities: 30 | after 1990: 23 |
| Number of all records: 40 | after 1990: 31 |

| |
|--|
| Extent of Occurrence (EOO): 31,529 km ² |
| Area of Occupancy (AOO): 112 km ² |

% of records per period:

1850-1920 1921-1990 1991-2013

| | | |
|---|----|----|
| 5 | 20 | 75 |
|---|----|----|

IUCN Red List Criteria: VU B1ab(iii)+2ab(iii)

IUCN Red List Category: VULNERABLE

References & Synonymy:

Macrogomphus lankanensis, Fraser, 1933, Ceylon J. Sci. (B) 18(1): 20, 24-26, figs. 2, c-d.

Macrogomphus annulatus ? - LAIDLAW (1924): 340; *Macrogomphus lankanensis* - FRASER (1933d): 20, 24-26, figs. 2c-d; FRASER (1934): 342, 349-351, fig. 111; LIEFTINCK (1955): 81; FERNANDO (1964): 191; KIMMINS (1966): 225; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1985): 33; TSUDA (1986): 93, 222; FERNANDO (1990): 187; BRIDGES (1994): VII.130; BEDJANIĆ (1998): 9, 40, 59, 63, 65, 67, 77; DE FONSEKA (2000): 13, 119-120, 211, 283, fig. B74; IUCN SRI LANKA (2000): 26; BEDJANIĆ (2004): 284, 288-289; BEDJANIĆ (2006a): www.iucnredlist.org; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23, 25; BEDJANIĆ et al. (2006): pl. 10; BEDJANIĆ et al. (2007): 17; 126-127; IUCN SRI LANKA & MOENR (2007): 46; WCSG (2008): 9, 15; WCSG (2009): 10, 15; BEDJANIĆ (2009b): www.iucnredlist.org; VAN DER POORTEN (2009b): 56; VAN DER POORTEN (2011c): 72; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 8; *Microgomphus* (sic!) *lankanensis* - LAIDLAW (1951): 80; *Macrogomphus lankanensis lankanensis* - VAN TOL (1992): 136;

Faunistic records: APPENDIX 2, page 302;

Microgomphus wijaya Lieftinck, 1940

Wijaya's Scissortail

ENDEMIC

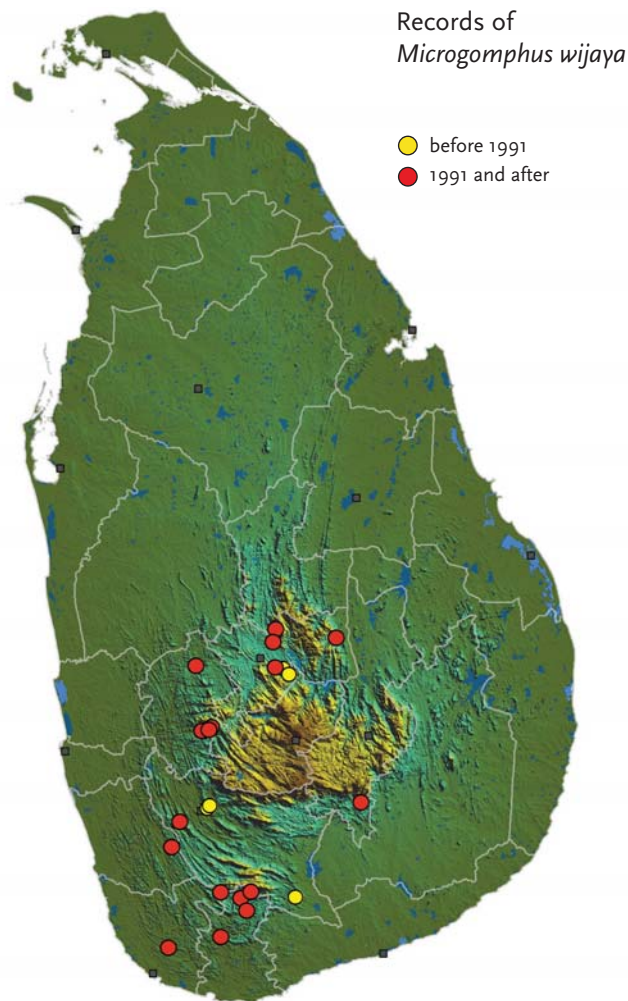
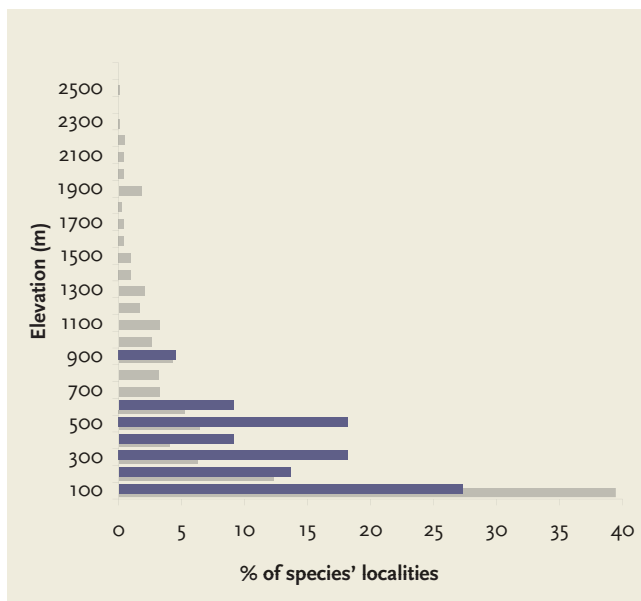
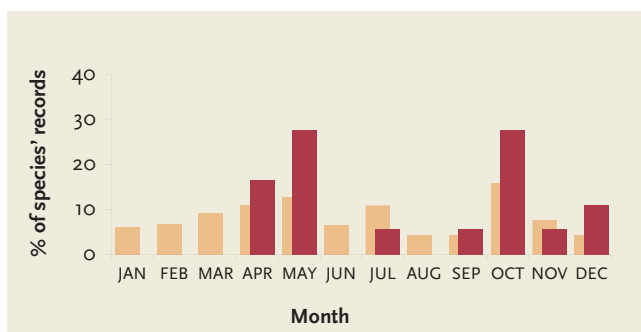
Smallest and most adorable of the Sri Lankan Clubtails is *Microgomphus wijaya*. Apart from its small size, it is easily recognized by its vivid green eyes, predominantly yellow sides of the thorax and the characteristically branched superior anal appendages of the male. The simple triangular, non-bifid inferior anal appendages distinguish this island's endemic at a glance from the Indian representatives of the genus.

The species was described by M. A. Lieftinck, based on a series of emerging individuals collected together with their exuviae in September 1938 from the bed of a small tributary of the Mahaweli River near Haragama east of Kandy (LIEFTINCK, 1940). Until recently, another record from Haragama (LIEFTINCK, 1955) and three old records from Ratnapura District—the first one from near Panamure contributed by Smithsonian fellow O. S. Flint in 1970 and two others from near Ratnapura in the same year by members of the Austrian-Ceylonese Hydro-biological Mission (ST. QUENTIN, 1973)—were the only information on the distribution of *M. wijaya* in the island. In the last dozen years the species has been recorded in other regions as well. It is now also known from the outskirts of Knuckles, from Kithulgala, Sinharaja, Morapitiya and other localities in the southwestern part of Sri Lanka, while Diyaluma Falls near Koslanda remains the only known locality in the east.



As for the other species of the family in which larval forms have been described, of easily recognizable larvae enabled confirmation of the species' presence in over one-third of the new localities registered after 2001. Larval sampling is the method of choice which should be used in future faunistic fieldwork and monitoring of *M. wijaya*.

Based on the hereto-gathered knowledge, *M. wijaya* inhabits rivers and streams with rich surrounding vegetation in the plains and lower hills. Such habitats are under threat by the destruction of primary and secondary rainforests, the destruction of forest corridors along streams, pollution and other pressures on streams and rivers in the southwestern and central part of Sri Lanka. Based solely on additional data, without any improvement in threat factors, the IUCN Red List category of this globally threatened species is proposed to be changed from Endangered (BEDJANIČ, 2006a; 2009b) to Vulnerable.



| | |
|------------------------------|----------------|
| Number of all localities: 21 | after 1990: 16 |
| Number of all records: 21 | after 1990: 16 |

| |
|---|
| Extent of Occurrence (EOO): 8,382 km ² |
| Area of Occupancy (AOO): 80 km ² |

% of records per period:



IUCN Red List Criteria: VU B1ab(iii)+2ab(iii)

IUCN Red List Category: VULNERABLE

References & Synonymy:

Microgomphus wijaya, Lieftinck, 1940, Ceylon J. Sci. (B) 22(1): 98-104, fig. 4-6, pl. I-fig.4.

Microgomphus wijaya - LIEFTINCK (1940): 81, 98-104, figs. 4-6, pl. I-fig.4; LAIDLAW (1951): 80; LIEFTINCK (1955): 83; FERNANDO (1964): 191; LIEFTINCK (1971a): 206; LIEFTINCK (1971b): 119; ST. QUENTIN (1973): 118, 123; STARMÜHLNER (1984): 230; GEIJSKES & KIAUTA (1984): 30; DAVIES & TOBIN (1985): 34; TSUDA (1986): 94, 222; FERNANDO (1990): 187; VAN TOL (1992): 235; BRIDGES (1994): VII.252; BEDJANIĆ (1998): 10, 40, 59, 63, 65, 67, 77; DE FONSEKA (2000): 13, 121-122, 211, 237, 241, 268-269, figs. B77a-c, C33: 1-3, C34: 4; IUCN SRI LANKA (2000): 26; BEDJANIĆ (2001): 10; DE SILVA WIJAYERATNE et al. (2003): pl. 4; BEDJANIĆ (2004): 281, 284, 288-289; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 22-23, 25; BEDJANIĆ et al. (2006): pl. 10; BEDJANIĆ et al. (2007): 17, 128-129; IUCN SRI LANKA & MOENR (2007): 46; BEDJANIĆ (2009b): www.iucnredlist.org; VAN DER POORTEN (2009b): 56; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 1,2, 7;

Faunistic records: APPENDIX 2, page 302;

Megalogomphus ceylonicus (Laidlaw, 1922)

Sri Lankan Sabretail

ENDEMIC

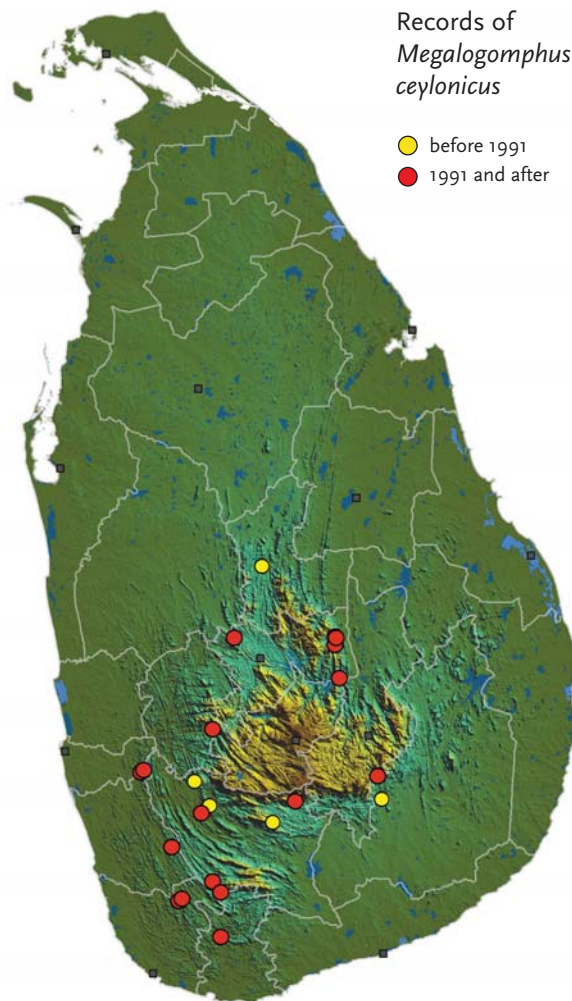
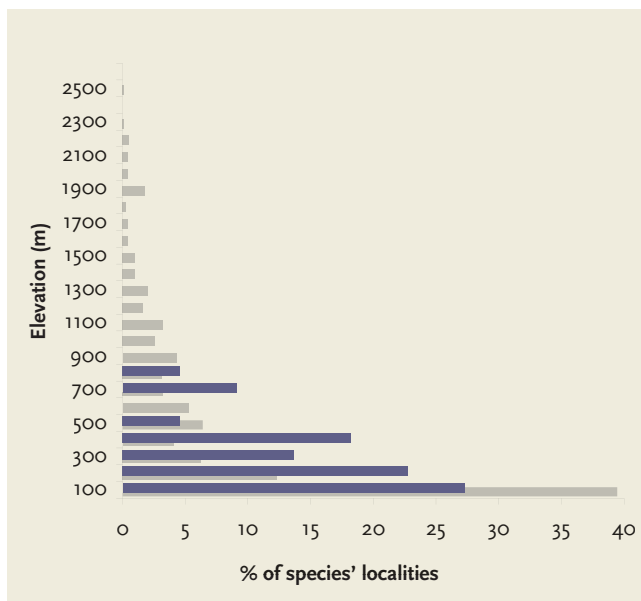
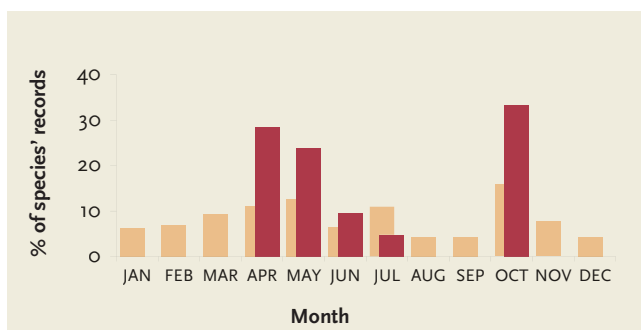
As far as colours are concerned, the Clubtails are not very diverse, but they make up this deficit with the rich variety of patterns on the head, thorax and abdomen. However, *Megalogomphus ceylonicus* deviates from the more desolate average in combining beautiful blue eyes with a grass green and black face and thorax, while the abdomen bears an attractive combination of velvet black, green and yellow.

Until recently, only a few records of this species have been known, comprising Balangoda as the type locality (LAIDLAW, 1922), Nalande (FRASER, 1933d), two localities near Ratnapura recorded by Austrian-Ceylonese Hydro-biological Mission (ST. QUENTIN, 1973) and an unpublished record of G. von Rosen from the vicinity of Wellawaya in April 1976. In the last few years, our knowledge on the distribution and habitats of *M. ceylonicus* has been considerably expanded. However, it is still considered a quite uncommon species. It inhabits shallow sandy streams and rivulets, some of which seem too small for its large size. It counts among the dragonflies of the lowlands and lower hills and is sparsely distributed all around the central mountainous part of the island, being most common in the southwestern parts.



Its larva, described several decades ago by FRASER (1933d), has an elongated body and is the most corpulent of all Sri Lankan Clubtails. It is also easily recognizable even in its younger larval stages. Since *M. ceylonicus* is clearly seasonal and almost impossible to spot outside of the flying season of the adults, which is April to July and probably September to November, larval sampling of streams in southwestern Sri Lanka would be a rewarding task for this species too as well as for many other Clubtails.

The threat status of *M. ceylonicus* has not been assessed so far but based on currently known data and various pressures on its habitats, it is clear that it belongs among the globally threatened species. In the recently published National Red List of Sri Lanka it was listed as an Endangered species by VAN DER POORTEN & CONNIFF (2012). On the global level and based on newly available data, *M. ceylonicus* is proposed for inclusion in the IUCN category of Vulnerable species.



| | |
|-------------------------------------|-----------------------|
| Number of all localities: 22 | after 1990: 17 |
| Number of all records: 24 | after 1990: 19 |

| |
|---|
| Extent of Occurrence (EOO): 9,764 km² |
| Area of Occupancy (AOO): 88 km² |

% of records per period:

1850-1920 1921-1990 1991-2013

| | |
|----|----|
| 21 | 79 |
|----|----|

IUCN Red List Criteria: **VU B1ab(iii)+2ab(iii)**

IUCN Red List Category: **VULNERABLE**

References & Synonymy:

Heterogomphus ceylonicus, Laidlaw, 1922, Rec. Indian Mus. 24(3): 412, fig. 21.

Heterogomphus ceylonicus - LAIDLAW (1922): 412, fig. 21; FRASER (1923a): 62; FRASER (1923b): 331; FRASER (1923d): 676-677; *Heterogomphus* sp. - LAIDLAW (1924): 342; *Heterogomphus ceylonicus* - LAIDLAW (1924): 374; *Megalogomphus ceylonicus* - LAIDLAW (1930): 197; NEEDHAM (1932): 222; FRASER (1933d): 19, 20, 22-24, fig. 1; FRASER (1934): 294, 298-300; SCHMIDT (1934): 375; LIEFTINCK (1940): 113-114; LAIDLAW (1951): 80; LIEFTINCK (1955): 84; FERNANDO (1964): 191; LIEFTINCK (1971a): 206; ST. QUENTIN (1973): 119, 123, fig. 9; STARMÜHLNER (1984): 225, 230; DAVIES & TOBIN (1985): 41; TSUDA (1986): 93, 222; FERNANDO (1990): 187; VAN TOL (1992): 62; BRIDGES (1994): VII.47; PRASAD & VARSHNEY (1995): 414; BEDJANIĆ (1998): 9, 41, 59, 63, 67, 77; DE FONSEKA (2000): 13, 111-112, 236, 239-240, 267, 283, figs. C28: 8-9; IUCN SRI LANKA (2000): 26; DE SILVA WIJAYERATNE et al. (2003): pl. 3; BEDJANIĆ (2004): 284, 288; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2006): pl. 9; BEDJANIĆ et al. (2007): 17, 120-121; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 7;

Faunistic records: APPENDIX 2, page 303;

Paragomphus henryi (Laidlaw, 1928)

Brook Hooktail

ENDEMIC

One of the commonest endemic representatives of the Clubtails in Sri Lanka is *Paragomphus henryi*. Until recently it was the only known representative of its genus in the island, described by F. F. Laidlaw, based on material collected in June 1924 east of Kandy at Woodside, Urugalla (LAIDLAW in CAMPION & LAIDLAW, 1928).

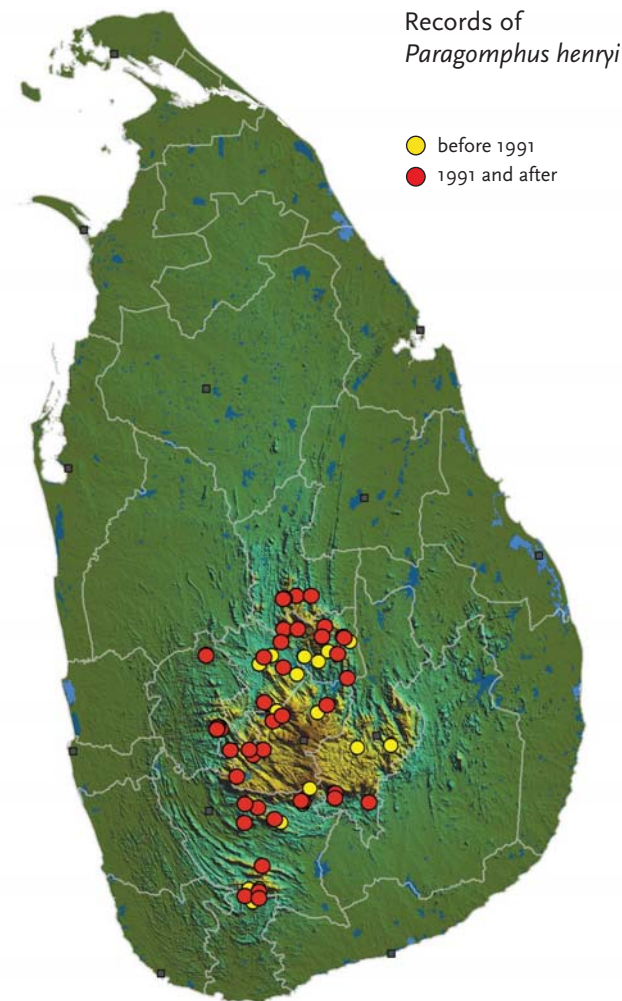
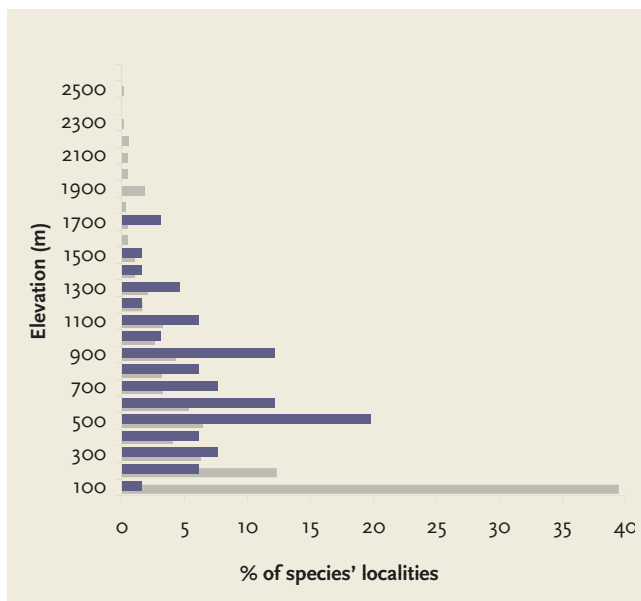
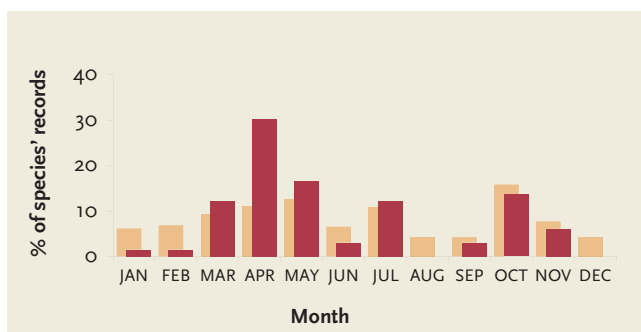
A full eight decades ago, FRASER (1933d, 1934) wrote “*It is the commonest Gomphine found in the island, and is met in numbers on most streams in submontane areas...*”. Nowadays, due to diverse negative human influences on running waters, the situation seems different and *P. henryi* is not so common anymore, being known from altogether less than 70 localities concentrated in the central and southwestern part of Sri Lanka. Here, the species inhabits fast to moderately slowly flowing streams and rivulets in the hills and mountains. The records of adult insects originate from March to July and from September to November.

Males are often seen resting on sunny stones in the middle of streams or rivulets and are easy to recognize due to their characteristic black and yellow outfit and slightly dilated abdomen tip with sharply curved anal appendages in the form of a hook. Females are an extremely rare sight and nothing is known on mating and the female’s behaviour. The larva of *P. henryi* was described by LIEFTINCK



(1940) and it is interesting that almost a quarter of the species’ localities were discovered solely based on findings of larvae or exuviae. This underlies the importance of different methods of odonatological fieldwork, especially for seasonal species such as *P. henryi*, and species which have very specialised and, usually, poorly known behaviour.

It is very likely that dedicated searches for the larvae of *P. henryi* would yield many new records. However, it is clear that Fraser’s old quotations of its abundance are not relevant anymore and that due to pollution and other pressures on streams and rivers, its populations have decreased markedly in the last few decades. Based on this, the threat status assessment of BEDJANIČ (2009b) is retained and *P. henryi* is globally ranked as a Near Threatened species according to IUCN Red List criteria. Based on current knowledge, further fieldwork and monitoring of population trends are necessary to estimate the rate of decline.



| | |
|-------------------------------------|-----------------------|
| Number of all localities: 66 | after 1990: 45 |
| Number of all records: 79 | after 1990: 55 |

| |
|---|
| Extent of Occurrence (EOO): 6,800 km² |
| Area of Occupancy (AOO): 232 km² |

% of records per period:



IUCN Red List Criteria: NOT APPLICABLE

IUCN Red List Category: NEAR THREATENED

References & Synonymy:

***Mesogomphus henryi*, Laidlaw in Campion & Laidlaw, 1928, Proc. zool. Soc. Lond. 1928: 131-132.**

Mesogomphus lineatus - LAIDLAW (1924): 340-341, fig. 1; *Mesogomphus henryi* - CAMPION & LAIDLAW (1928): 131-132; NEEDHAM (1932): 221; FRASER (1933d): 20, 33; FRASER (1934): 230, 234-235; SCHMIDT (1934): 371, fig. 82; *Paragomphus henryi* - LIEFTINCK (1940): 81, 112-113, fig. 10, pl. I-fig. 5; LAIDLAW (1951): 80; LIEFTINCK (1955): 84; FERNANDO (1964): 191; LIEFTINCK (1971a): 202, 206; ST. QUENTIN (1973): 120, 123; STARMÜHLNER (1984): 225; DAVIES & TOBIN (1985): 47; TSUDA (1986): 99, 223; FERNANDO (1990): 187; VAN TOL (1992): 118; BRIDGES (1994): VII.106; BEDJANIĆ (1998): 9-10, 15, 40-41, 59, 63, 65, 77; DE FONSEKA (2000): 13, 112-113, 210, 237, 240, 267, 269, figs. B70a-b, C29: 1-2, C34: 5; IUCN SRI LANKA (2000): 26; BEDJANIĆ (2002): 1, 5, 14; DE SILVA WIJEYERATNE et al. (2003): pl. 3; BEDJANIĆ et al. (2006): pl. 10; BEDJANIĆ et al. (2007): 17, 122-123; BEDJANIĆ (2009b): www.iucnredlist.org; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 7;

Paragomphus campestris Bedjanič, 2013

Lowland Hooktail

ENDEMIC



Taxonomic studies often resemble a detective story and the recent discovery of a new *Paragomphus* species in the State Collection of Zoology in Munich in Germany is one of such.

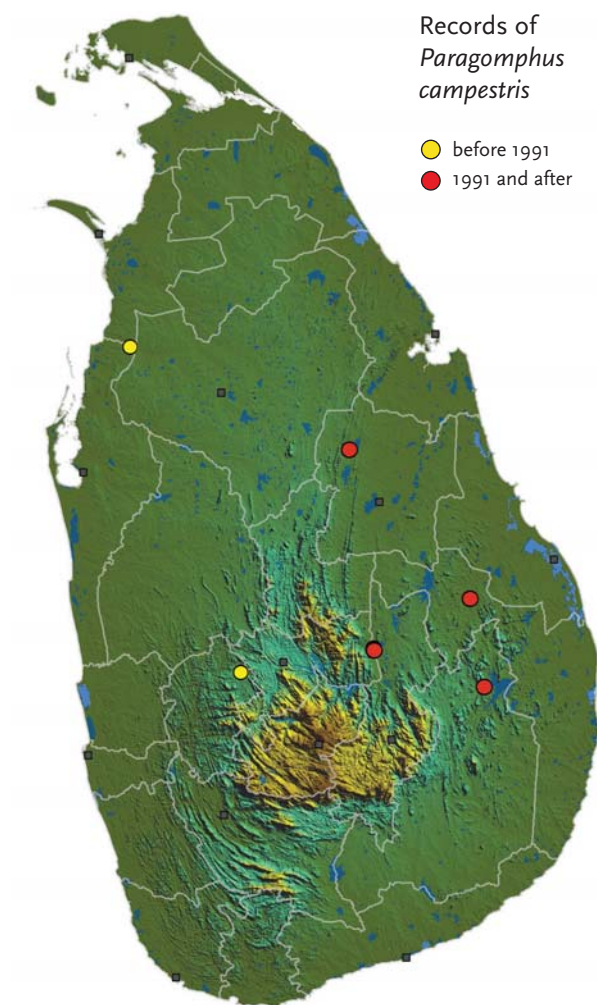
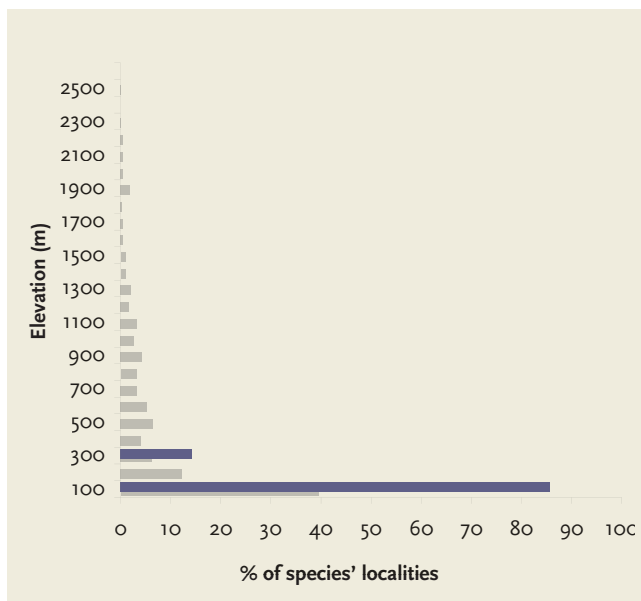
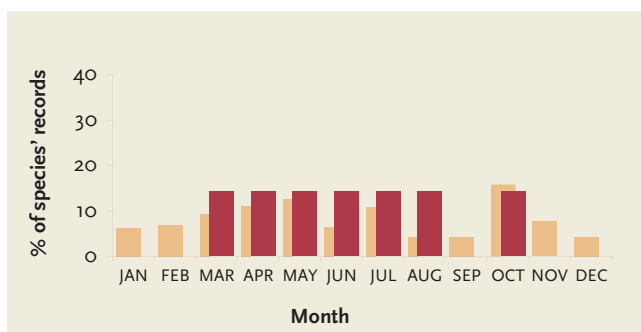
It all began with a single widely isolated record of *P. henryi* from the northeastern plains of the island, collected in Wilpattu National Park in 1976 by the Smithsonian Insect Project in Sri Lanka. This puzzling information somehow just didn't match the general ecological and distributional picture of that hilly species. Only in 2011, a different looking specimen labeled as *P. henryi* was discovered in the rich odonatological collection of G. von Rosen in Munich and it became clear that a second endemic *Paragomphus* species, described meanwhile as *P. campestris*, occurs in the lowlands of Sri Lanka (BEDJANIČ, 2013).

This new species is closely related to *P. henryi*, from which it can be easily differentiated by the more extensive yellow markings and clearly different male anal appendages. Currently, *P. campestris* is known from only six localities, which lie exclusively in the northern and eastern lowlands of Sri Lanka, except for the type locality, Hingula Oya near Mawanella,

which is located in the north central part of the island. It inhabits slowly flowing streams and rivulets with some shrubs and trees on the banks as well as large lowland rivers like the Mahaweli Ganga. The flight season of the species reaches at least from April till October and emergence has been observed in June, July, August and October (BEDJANIČ, 2013).

Probably, *P. campestris* is more widely distributed in the northern lowlands of the island, especially since odonatological fieldwork in the last few dozens of years has been largely focused on the endemic-rich southwestern part of the island. A more detailed assessment of the distribution, estimation of population sizes and future monitoring are needed for this lowland endemic Hooktail.

Based on extrapolation of available data on its biology and habitat requirements, and a very small number of known localities, *P. campestris* is assessed as globally threatened and ranked as a Vulnerable species according to IUCN criteria.



| | |
|-----------------------------|---------------|
| Number of all localities: 7 | after 1990: 5 |
| Number of all records: 8 | after 1990: 6 |

| |
|--|
| Extent of Occurrence (EOO): 11,725 km ² |
| Area of Occupancy (AOO): 24 km ² |

% of records per period:

1850-1920 1921-1990 1991-2013

| | |
|----|----|
| 25 | 75 |
|----|----|

IUCN Red List Criteria: VU B1ab(iii)+2ab(iii)

IUCN Red List Category: VULNERABLE

References & Synonymy:

Paragomphus campestris, Bedjanič, 2013, Odonatologica 42(1): 45-52, figs. 1-9.

Paragomphus campestris - BEDJANIČ (2013a): 45-52, figs. 1-9;

Faunistic records: APPENDIX 2, page 303;

Gomphidia pearsoni Fraser, 1933

Rivulet Tiger

ENDEMIC

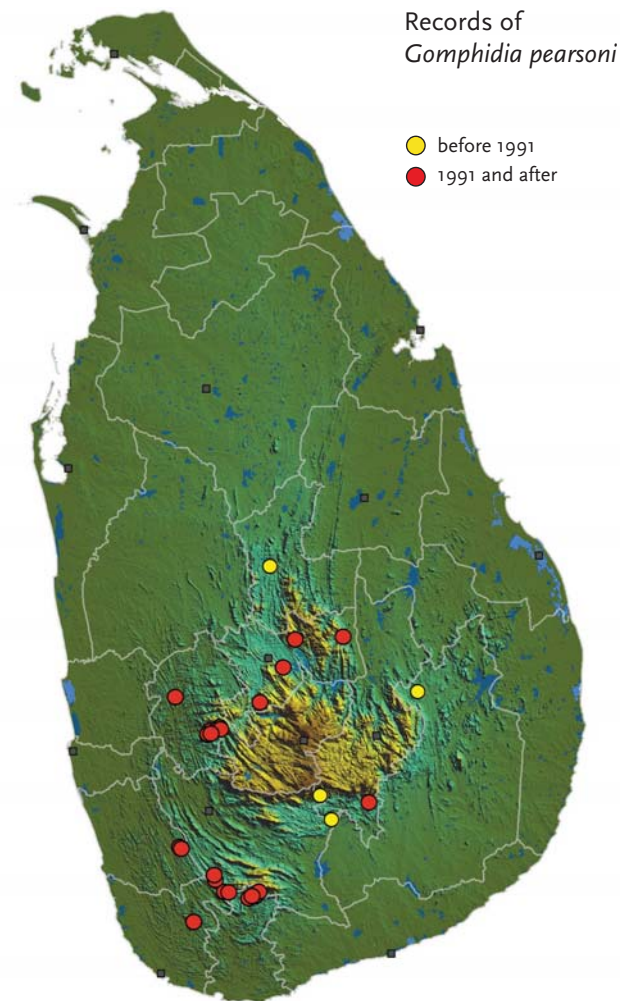
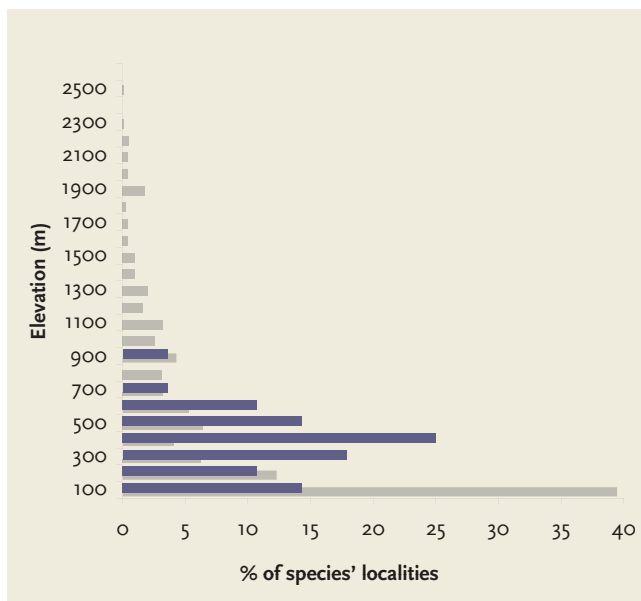
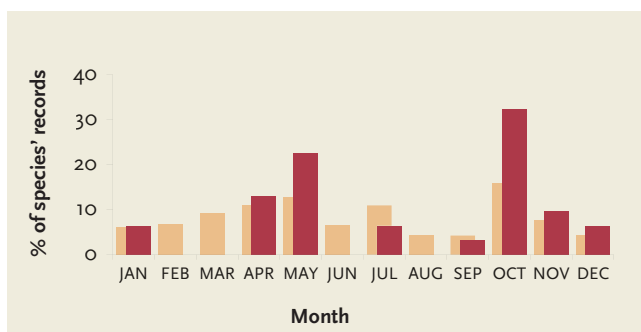
An elegant, velvety black body with beautifully contrasting yellow markings on the head, thorax and abdomen belong to *Gomphidia pearsoni*, the biggest of all endemic Sri Lankan Clubtails.

Adults of *G. pearsoni* are rulers of the dragonfly scene in their environs. Males usually perch on a prominent twig or leaf and from there repeatedly patrol in strong flight along their section of the stream or rivulet. Females are extremely rarely seen and are still undescribed. Apart from looking for adults, another way of detecting the species' presence is to look for its officially still undescribed but easily recognizable larvae or exuviae. The larvae live in sections of the river with a calmer current and in pools where they use their strong legs to nestle their flat and round bodies into the bottom debris or gravel. The exuviae can be found in the right season of emergence a few decimetres high on rocks or stems at the water's edge.

The species has a scattered distribution in the central and southwestern part of the island. It avoids higher altitudes but rather prefers the lowlands and mid-hills where it inhabits moderately fast to slow flowing streams with pools, rivulets and rivers in primary and secondary rainforest and the surrounding less disturbed areas. There are isolated records from the wider surroundings of Kandy including the outskirts of the Knuckles area. Numerous sightings originate from the vicinity of Kithulgala, and the species is regularly reported from Sinharaja and its surroundings. From the southeast the only recent observation comes from the stream below the famous Diyaluma Falls. The peak of the species' flight season seems to be in April-May and again in October and subsequent months.



Destruction of primary and secondary rainforests, destruction of forest corridors along streams, pollution and other pressures on streams and rivers in the southwestern and central part of Sri Lanka are the major threats for many stream and riverine endemics, including *G. pearsoni*. In the last few years, despite intensive work in the central and southwestern part of Sri Lanka, the influx of new localities for the species has only been moderate, meaning that it is not very common and that it is endangered, especially in the highly fragmented landscapes outside the remaining primary and secondary forest patches. As a result *G. pearsoni* was included among the globally threatened dragonflies and ranked as Endangered (BEDJANIČ, 2006a). The same category was adopted by VAN DER POORTEN & CONNIFF (2012) in the recently published national Red List. Based on a more complete dataset it is assessed as a species of the Vulnerable IUCN category in the present publication.



| | |
|-------------------------------------|-----------------------|
| Number of all localities: 28 | after 1990: 24 |
| Number of all records: 30 | after 1990: 26 |

| |
|---|
| Extent of Occurrence (EOO): 9,812 km² |
| Area of Occupancy (AOO): 92 km² |

% of records per period:

1850-1920 1921-1990 1991-2013

| | |
|----|----|
| 13 | 87 |
|----|----|

IUCN Red List Criteria: VU B1ab(iii)+2ab(iii)

IUCN Red List Category: VULNERABLE

References & Synonymy:

Gomphidia pearsoni, Fraser, 1933, Ceylon J. Sci. (B) 18(1): 20, 21-22.

Gomphidia pearsoni - FRASER (1933d): 20, 21-22; FRASER (1934): 383, 391-392; LAIDLAW (1951): 80; LIEFTINCK (1955): 81; FERNANDO (1964): 191; KIMMINS (1966): 226; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1985): 55; TSUDA (1986): 88, 221; FERNANDO (1990): 187; BRIDGES (1994): VII.181; BEDJANIĆ (1998): 9, 39, 59, 63, 67, 77; DE FONSEKA (2000): 13, 104, 122-123, 242, 283; IUCN SRI LANKA (2000): 26; IUCN SRI LANKA & MOENR (2007): 46; DE SILVA WIJAYERATNE et al. (2003): pl. 4; BEDJANIĆ (2004): 284, 288-289; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 22-23, 25; BEDJANIĆ et al. (2006): pl. 10; BEDJANIĆ et al. (2007): 17, 130-131; BEDJANIĆ (2009b): www.iucnredlist.org; VAN DER POORTEN (2009b): 56; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 8;

Faunistic records: APPENDIX, page 303-304;

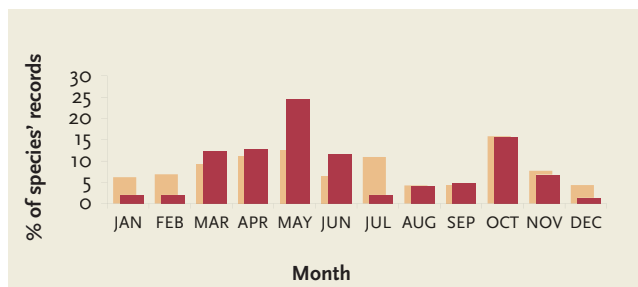
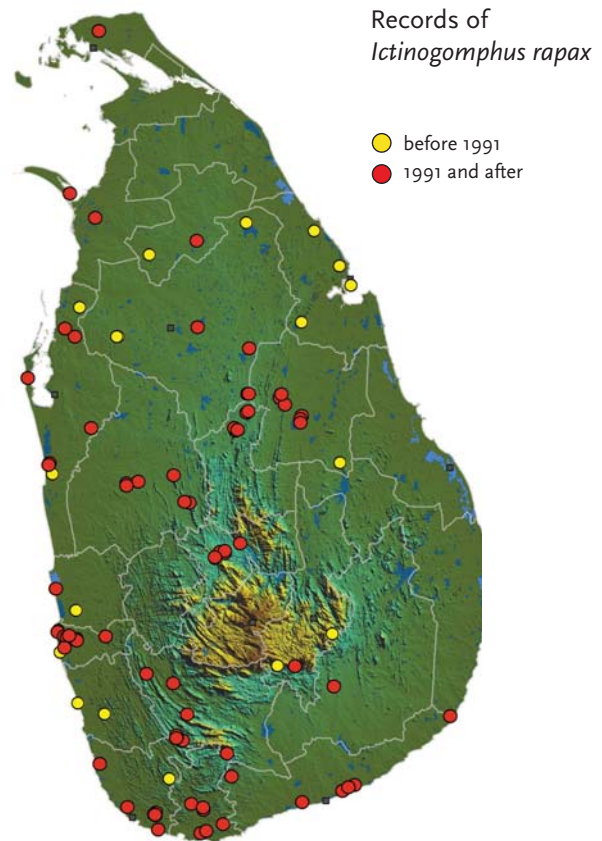
Ictinogomphus rapax (Rambur, 1842)

Rapacious Flangetail

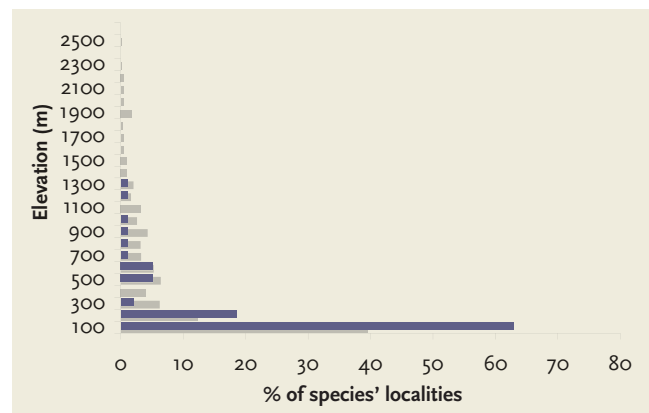
Out of all Clubtails in Sri Lanka, *Ictinogomphus rapax* is the only one which is predominantly associated with stagnant waters and the only non-endemic. It prefers still water reservoirs and small ponds, but also slow rivers, canals and marshes. This robust species is widely distributed in India and its range further extends through Nepal to China.

Its large size, bluish-grey eyes, characteristic mix of black grounding with yellow markings as well as lateral leaf-like expansions near the abdomen tip make the male of *I. rapax* unmistakable. The female is quite similar, but stouter and with far less prominent lateral abdominal expansions. *I. rapax* is usually seen perching on a prominent bare branch or stem, waiting for prey and winged brides of its kind, hereby defending its territory against other males. It is well-known for being a rapid flyer and voracious hunter, catching and eating even larger dragonflies. The larva is limpet-like and with its broad flat abdomen superficially resembles that of *Gomphidia*.

Being the commonest Clubtail in Sri Lanka, it occurs all over the island and is not threatened. Fieldwork focused on tanks and reservoirs in the east is likely to expand the known distribution of this species.



| | |
|-------------------------------------|------------------------|
| Number of all localities: 99 | after 1990: 75 |
| Number of all records: 159 | after 1990: 130 |









CORDULIIDAE

Emeralds

***Epophthalmia vittata*
cycanocephala
Hagen, 1867**

Blue-eyed Pondcruiser

ENDEMIC

The largest and the most magnificent of the endemic Emeralds is *Epophthalmia vittata cycanocephala*. As the common and Latin names suggest, the beautiful blue eyes are clearly visible when it is flying over ponds, small lakes and canals. It is a rapid flyer that rarely stops and when it does it hangs pendulously by its long slender legs from tree branches. The colouring of very dark metallic green on the thorax and dark reddish brown fading into predominant black on the abdomen is a good camouflage for this species when settled in the trees. A few yellow and orange stripes on the thorax and abdomen are clearly visible when on the wing.

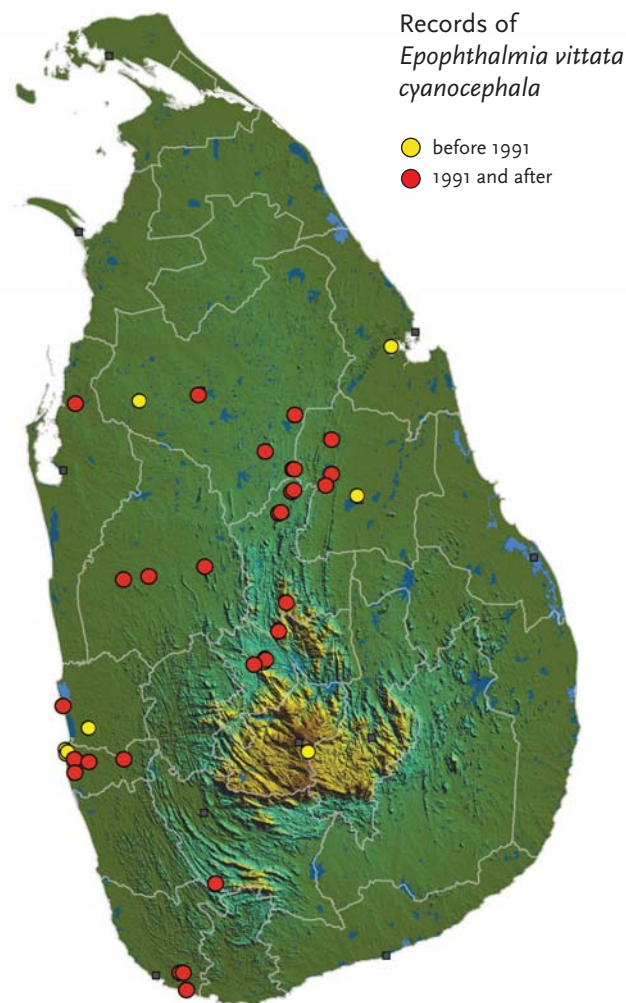
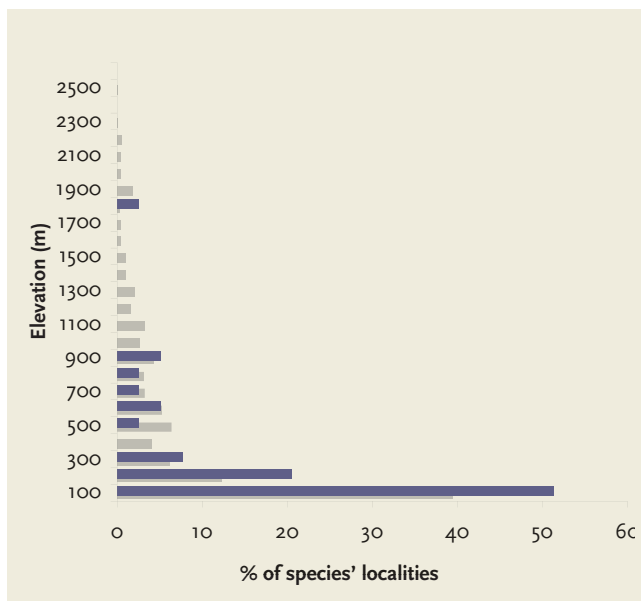
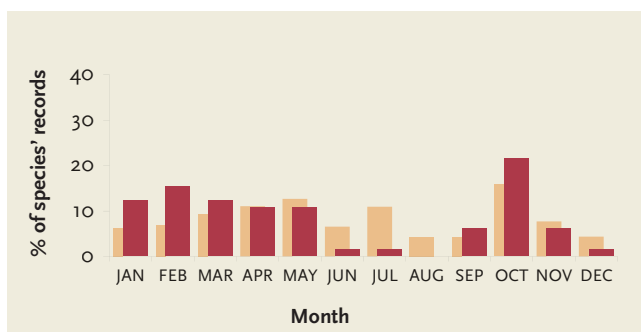
This species was one of the first reported from Sri Lanka by H. A. Hagen in 1858 and it was the same author who officially described it as new to science in 1867 (HAGEN, 1858; 1867). Although structurally quite similar to the nominotypical subspecies, *E. vittata cycanocephala* is distinguished from it by having the superior surface of the frons dark blue or metallic green without any yellow markings, by the pointed yellow antehumeral stripes and by the much narrower yellow annules on the abdomen which is almost black and not dark reddish-brown to dark ochreous as in *E. v. vittata*.

E. vittata cycanocephala is among only a few endemic dragonflies for which the final, and very peculiar, larval stage has been described (BEDJANIĆ, 2000; BEDJANIĆ & ŠALAMUN, 2002). Its exuviae, which can be found clinging among the stems of vegetation near the shore, on tree trunks and under leaves overhanging the water, cannot be mistaken for any other species—it is very large with very long spidery legs, a small rectangular head with only small pointed eyes, and a broadly oval abdomen with strong dorsal spines. Of special interest, however, is its large and specialized labium with its



deeply cleft labial palps, which are transformed into long, frightening, sharply pointed hooks, which are without comparison in any other dragonfly genus.

E. vittata cycanocephala is predominantly found in the lowlands but occasionally also in the lower hills, whereby the observation of LIEFTINCK (1940) from Hakgala Botanic Gardens is an isolated altitudinal record holder. The best season to observe the adult insects on the wing is from January to May and September to November. It inhabits different types of stagnant waters, ranging from vegetated ponds and marshes with canals, to larger freshwater lakes, including those with only sparse or no submerged vegetation. Since there are thousands of water tanks all over the island, *E. vittata cycanocephala* is probably more common than evident from the hereto collected data. Thus, the relatively low number of known localities is the main reason for precautionally assessing the species as Near Threatened according to IUCN criteria. Future targeted fieldwork in the right habitats and in the right seasons is needed to yield a more complete outline of the distribution and threat status of this beautiful blue-eyed endemic.



Number of all localities: **40** after 1990: **29**

Number of all records: **70** after 1990: **53**

Extent of Occurrence (EOO): **25,215 km²**

Area of Occupancy (AOO): **152 km²**

% of records per period:

1850-1920 1921-1990 1991-2013

6 18 76

IUCN Red List Criteria: NOT APPLICABLE

IUCN Red List Category: NEAR THREATENED

References & Synonymy:

Epophthalmia cyanocephala, Hagen, 1867, Verh. zool.-bot. Ges. Wien 17: 60-61.

Epophthalmia vittata - HAGEN (1958): 479; TENNENT (1859): 282; TENNENT (1861): 454; MOTSCHULSKY (1963): 8; SUBRAMANIAN (2010): www.iucnredlist.org; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 8; *Epophthalmia cyanocephala* - HAGEN (1867): 60-61; BRAUER (1868b): 742; SELYS (1871): 534-535; KIRBY (1890): 54; KIRBY (1894): 545, 557; MARTIN (1906): 63, nec fig. 80, nec Pl. II, fig. 13; MARTIN (1914): 26; FRASER (1921): 678-679; NEEDHAM (1932): 211; *Azuma cyanocephala* - LAIDLAW (1924): 342-343; *Epophthalmia vittata cyanocephala* - FRASER (1936): 193, 196-197; LIEFTINCK (1931): 30, 35-36, 41, 58-61, fig. 6; LIEFTINCK (1940): 97; LAIDLAW (1951): 80; LIEFTINCK (1955): 80; FERNANDO (1964): 191; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1985): 73; TSUDA (1986): 122, 225; FERNANDO (1990): 187; VAN TOL (1992): 76; BRIDGES (1994): VII.62; BEDJANIĆ (1998): 9, 14, 42-44, 59, 63, 72, 77, 80 – app. 5.1.K, figs. 16-18; DE FONSEKA (2000): 13, 133-134, 213, 244, fig. B88a; BEDJANIĆ (2000): 57-61, figs. 1-3; BEDJANIĆ (2002): 1, 4, 15; BEDJANIĆ & ŠALAMUN (2002): 1-6, figs. 1-4; WCSG (2008): 16; BEDJANIĆ et al. (2007): 17, 148-149;

Macromia flinti Lieftinck, 1977

Flint's Cruiser

ENDEMIC

Both of the endemic Cruisers in Sri Lanka are poorly known. However, it is *Macromia flinti* which counts as the top enigmatic species confined to the island for which almost no information apart from the original description exists.

This conspicuous *Macromia*, which stands rather apart from the other congeners described from the Indian subcontinent, was described by M. A. Lieftinck, based on a single male collected between 10–14 October 1970 at “Uggalkaltota”, east of Balangoda (LIEFTINCK, 1977). It is named after its collector Dr. Oliver S. Flint Jr., Curator Emeritus of Neuropteroid Orders at the National Museum of Natural History of the Smithsonian Institution in Washington DC, USA. Dr. Flint was one of the leading researchers in “The Smithsonian Insect Project in Sri Lanka” which lasted for several years in the early 1970’s (KROMBEIN, 1981). Apart from caddisflies, his primary research interest, he collected many interesting dragonfly endemics in Sri Lanka, including some species recently described as new to science (e.g. BEDJANIČ, 2010). The recent odonatological studies from the island have been enriched immensely with the help and support of Dr. Flint, especially by valuable loans of materials and data shared by the Smithsonian Institution.

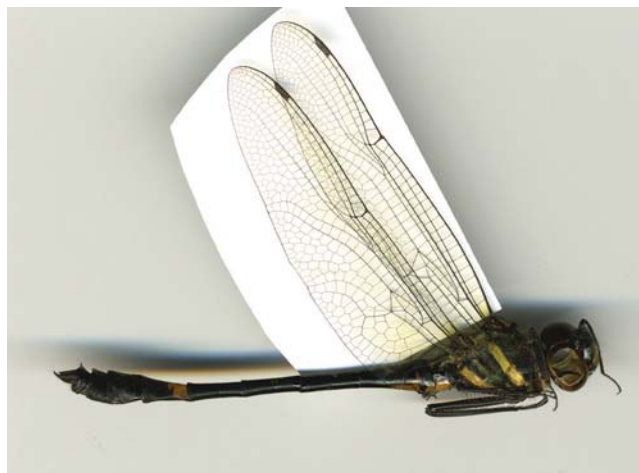
Macromia flinti differs from its more common endemic congener *M. zeylanica* by its larger size and different yellow markings on the metallic green thorax and the almost black abdomen. In particular, the lack of paired conspicuous dorsal citron yellow spots on the frons and the lack of broad chrome yellow antehumeral stripes on the thorax of *M. flinti* will separate these two endemic Cruisers even when in flight, while the deeply excavated base of the hind wing and the long robust dorsal spine on the last abdominal segment of the male are additional characters peculiar to *M. flinti* (LIEFTINCK, 1977).

M. flinti was one of the target species of the

CEYLON: Ratnapura Dist.;
Uggalkaltota, 500 ft.
10-14 Oct. 1970
Oliver S. Flint, Jr.

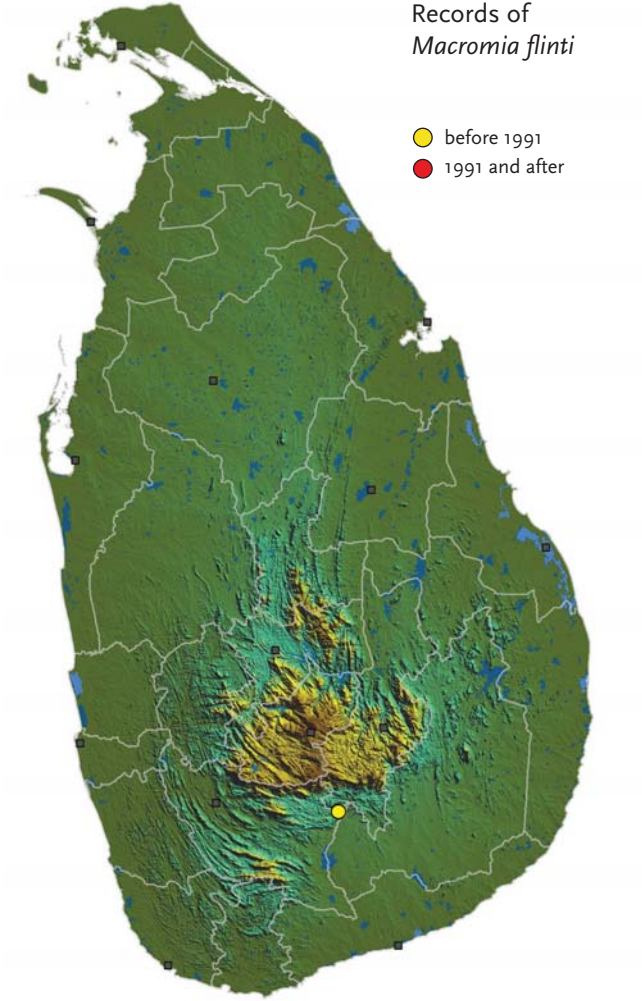
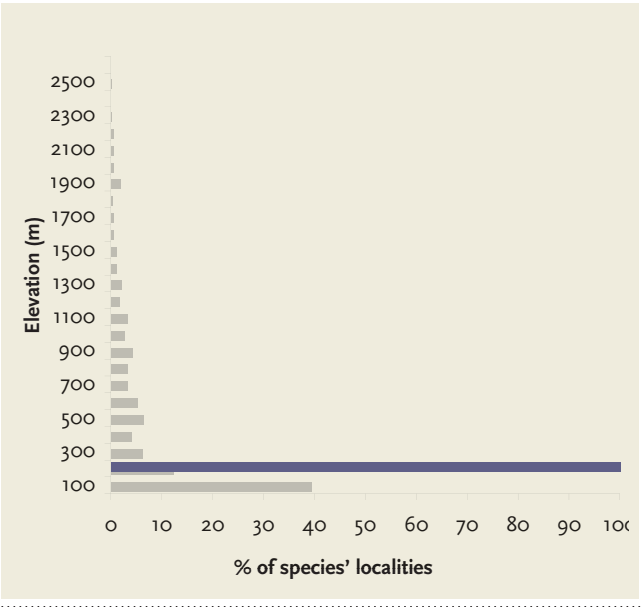
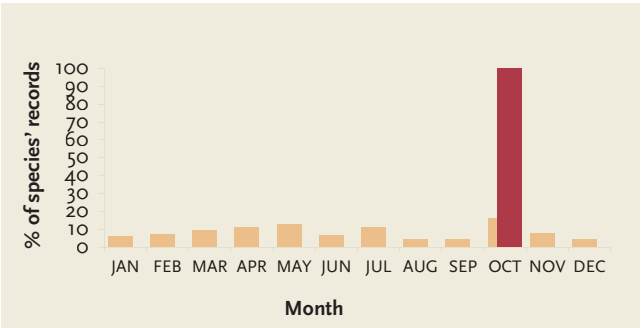


Collection U.S. National Museum



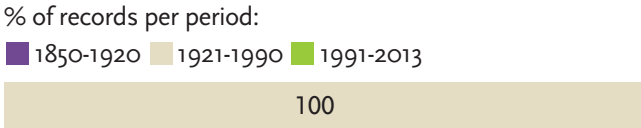
fieldwork carried out in 2012 by Matjaž Bedjanič and supported by the Rufford Foundation. Streams in the wider surroundings of Uggalkaltota as well as the Walawe River nearby were visited without success in mid-July and at the beginning of November. With only a few field days, in less than optimal season and weather, without any knowledge on the exact type locality and no data on species biology and behaviour, there is not enough information to draw firm conclusions on the species’ survival and conservation status. However, despite intensive usage of water from rivers and streams for irrigation, some habitats around Uggalkaltota still seem appropriate for *Macromia*, at least from the obtuse odonatologist’s perspective.

VAN DER POORTEN & CONNIFF (2012) listed *M. flinti* as a Data Deficient species in the National Red List 2012, while on the global level it is ranked as Critically Endangered according to IUCN criteria (BEDJANIČ, 2006a). Further fieldwork in September and October, also complemented with larval sampling, should be a priority in the future in order to confirm or dispel fears of extinction.



| | |
|-----------------------------|---------------|
| Number of all localities: 1 | after 1990: 0 |
| Number of all records: 1 | after 1990: 0 |

| | |
|-----------------------------|-------------------|
| Extent of Occurrence (EOO): | 4 km ² |
| Area of Occupancy (AOO): | 4 km ² |



IUCN Red List Criteria: CR B1ab(iii)+2ab(iii)
IUCN Red List Category: CRITICALLY ENDANGERED

References & Synonymy:

***Macromia flinti*, Lieftinck, 1977, Orient. Insects 11(2): 175-179, figs. 12-14.**
Macromia flinti - LIEFTINCK (1977): 175-179, figs. 12-14; GEIJSKES & KIAUTA (1984): 28; DAVIES & TOBIN (1985): 75; TSUDA (1986): 126, 226; FLINT (1991): 57; VAN TOL (1992): 104-105; BRIDGES (1994): VII.89; BEDJANIĆ (1998): 10, 44, 59, 63, 65, 67, 77; DE FONSEKA (2000): 13, 135-137, 214, 244, figs. B92a-d; IUCN SRI LANKA (2000): 26; BEDJANIĆ (2004): 284, 288-289; BEDJANIĆ (2006a): www.iucnredlist.org; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23, 25; BEDJANIĆ et al. (2007): 17; IUCN SRI LANKA & MOENR (2007): 46; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 7;
Faunistic records: APPENDIX 2, page 304;

Macromia zeylanica Fraser, 1927

Sri Lankan Cruiser

ENDEMIC

The first of the Cruisers described from Sri Lanka was *Macromia zeylanica*, based on a single male collected by Col. F. Wall in September 1924 at “Kandy” and sent for identification to F. C. Fraser, who didn’t hesitate in describing it as new to science (FRASER, 1927). Only a dozen years later, M. A. Lieftinck described its larval exuviae, collected under the bridge of a tributary of the Mahaweli River at Haragama (LIEFTINCK, 1940). To complete the species’ description dossier, the one for the female is still lacking, but material and photos for this remaining part are luckily already available.

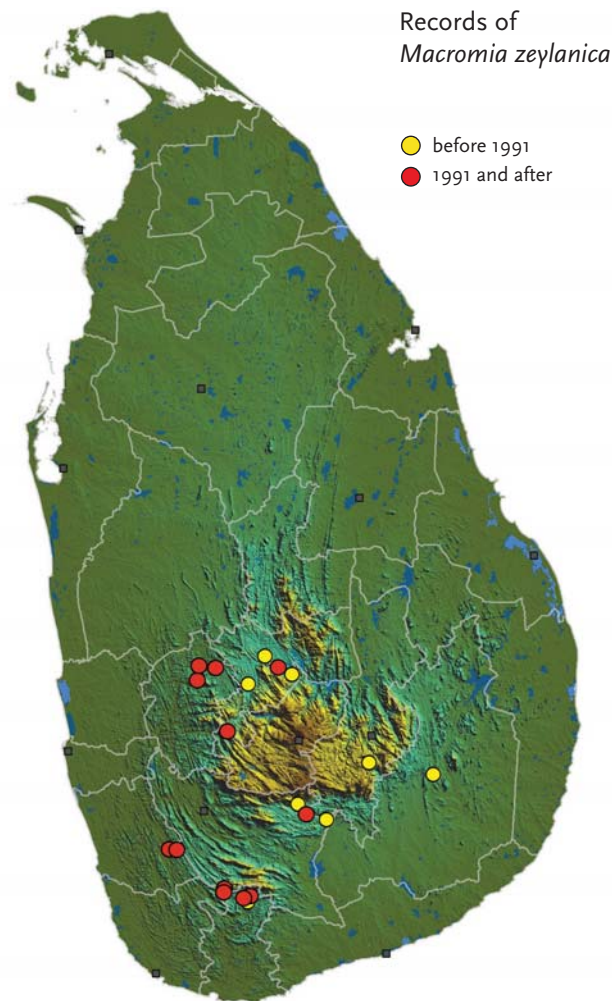
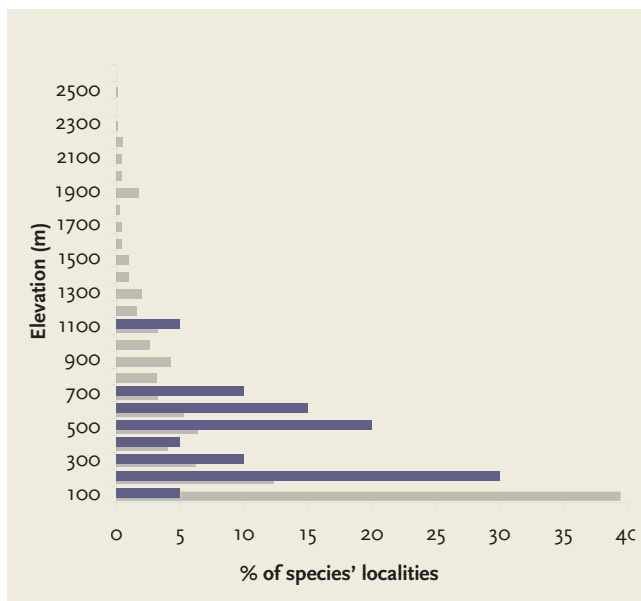
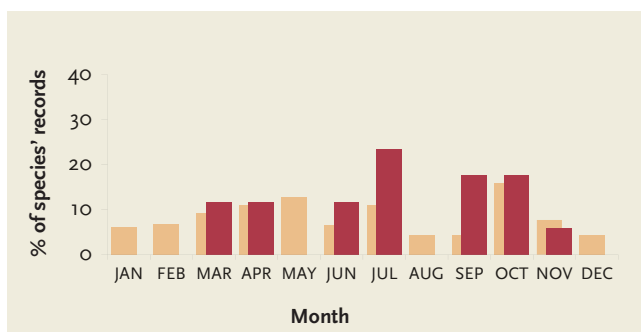
This beautiful stream-dwelling endemic can be recognized by its deep grass green eyes, black face and shiny metallic green thorax. The face is ornamented with a citron yellow band across the postclypeus as well as with a pair of lateral and two conspicuous oval dorsal spots on the frons. The thorax has conspicuous lateral yellow stripes of which the antehumeral ones, situated laterally like braces just behind the head, are lacking in its congener *M. flinti*. Its abdomen is black with characteristic yellow spots and only a bluntly triangular embossment instead of a robust and sharp dorsal spine on the last abdominal tergite of the male (FRASER, 1927; LIEFTINCK, 1977).

So far, *M. zeylanica* has been rarely recorded in the central and southwestern part of the island but actually it is the fault of the preceding rare congener that the distribution map is not a bit more densely dotted. Sighting Cruisers requires experience and with a contemporary overdose of odonatological excitement it is usually very hard to determine fast flying males, patrolling low over the pebbles of a stream or rivulet and even harder to be sure of the exact identity of an egg-laying female, erratically flying over short portions of wet sandy banks. Searching for sand-dwelling larvae of *M. zeylanica* is simple and at certain sections of streams they can



be surprisingly numerous. However, in the absence of any information on the larva of *M. flinti*, again these findings cannot be ascribed to the former with enough confidence.

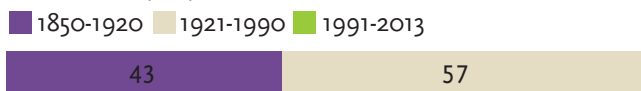
The best months to observe adults of *M. zeylanica* are July, September and October, but the species can be met on the wing from March to November. It is confined to streams and smaller rivers in the lowlands and mid-hills that have at least some remaining forest patches nearby. Although surely under-recorded, its distribution in southwestern and central Sri Lanka is fragmented due to vast areas of destroyed landscapes which have been converted into tea and rubber plantations. Water pollution and extraction, sand mining and ongoing forest destruction are additional threat factors negatively affecting its habitats. Based on a less complete dataset, VAN DER POORTEN & CONNIFF (2012) listed *M. zeylanica* as Critically Endangered in the National Red List. In the present publication it is assessed as globally endangered and ranked as Vulnerable according to IUCN criteria.



| | |
|-------------------------------------|-----------------------|
| Number of all localities: 20 | after 1990: 12 |
| Number of all records: 21 | after 1990: 12 |

| |
|---|
| Extent of Occurrence (EOO): 7,194 km² |
| Area of Occupancy (AOO): 80 km² |

% of records per period:



IUCN Red List Criteria: VU B1ab(iii)+2ab(iii)

IUCN Red List Category: VULNERABLE

References & Synonymy:

***Macromia zeylanica*, Fraser, 1927, Rec. Indian Mus. 29(2): 69-70.**

Macromia zeylanica - FRASER (1927): 69-70; FRASER (1936): 163, 182-183; LIEFTINCK (1940): 93-96, fig. 3, pl. 1; LAIDLAW (1951): 80; LIEFTINCK (1955): 80; FERNANDO (1964): 191; KIMMINS (1966): 218; KIMMINS (1968): 301; LIEFTINCK (1971a): 206; ST. QUENTIN (1973): 121-123; LIEFTINCK (1977): 173-175, figs. 9-11; STARMÜHLNER (1984): 225, 230; DAVIES & TOBIN (1985): 78; TSUDA (1986): 128, 226; FERNANDO (1990): 187; VAN TOL (1992): 237; BRIDGES (1994): VII.256; PRASAD & VARSHNEY (1995): 414; BEDJANIĆ (1998): 9-10, 44, 59, 63, 65, 67, 77; DE FONSEKA (2000): 13, 135-139, 214, 244-245, 269, 271, figs. B93a-c, C34-1, C41; IUCN SRI LANKA (2000): 26; DE SILVA WIJEYERATNE et al. (2003): pl. 4; BEDJANIĆ (2004): 284, 288; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; BEDJANIĆ et al. (2006): pl. 21; BEDJANIĆ et al. (2007): 17; 150-151; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 3, 7; *Macromia zeylanica* - NEEDHAM (1932): 211-212;

Faunistic records: APPENDIX, page 304;

Macromidia donaldi pethiyagodai van der Poorten, 2012

Forest Shadow-emerald

ENDEMIC

Dragonflies have a well-known reputation of being excellent fliers, but although being rather small, *Macromidia donaldi pethiyagodai* belongs to the most stunning racers among them and its swift air stunts are without comparison.

FRASER (1936) described the interesting habits of the nominotypical subspecies of this Shadow-emerald, which is known from the Western Ghats of India, as follows: “*They appear on the wing only on cloudy days, and are perhaps crepuscular or flight at early dawn and dusk for brief intervals. During the day they hide up in leafy tunnels formed by overarching trees and jungle... over small streams... From such tunnels they emerge through some small aperture, perform wild and extremely rapid evolutions in the air for a few moments, and vanish again to their retreats.*” Indeed, the Sri Lankan endemic behaves similarly, flying so quickly and erratically that it is almost impossible to follow its route, and its dark black and metallic green colours keep it well concealed in its natural habitat.

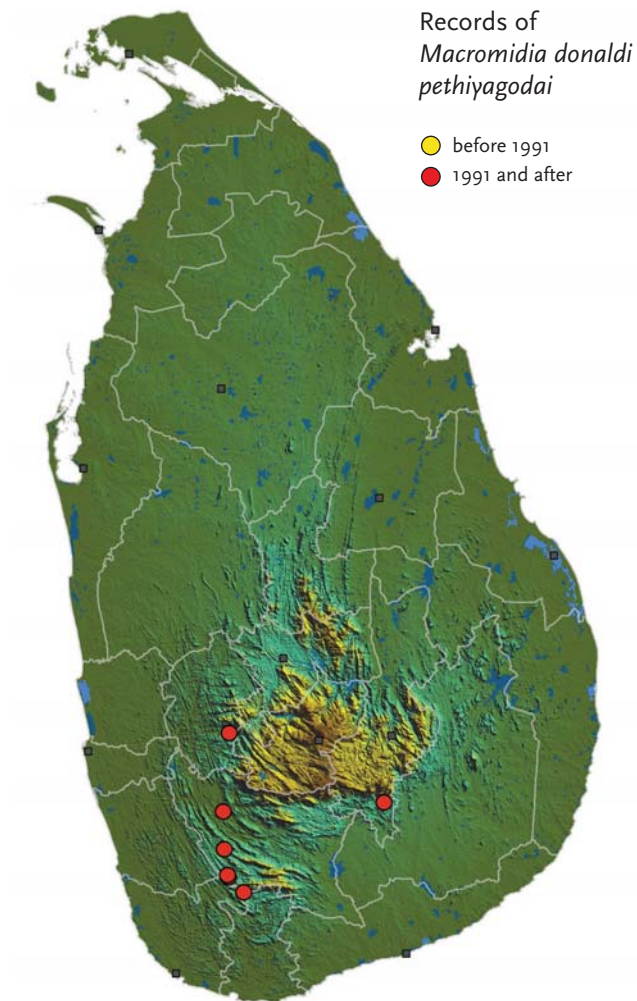
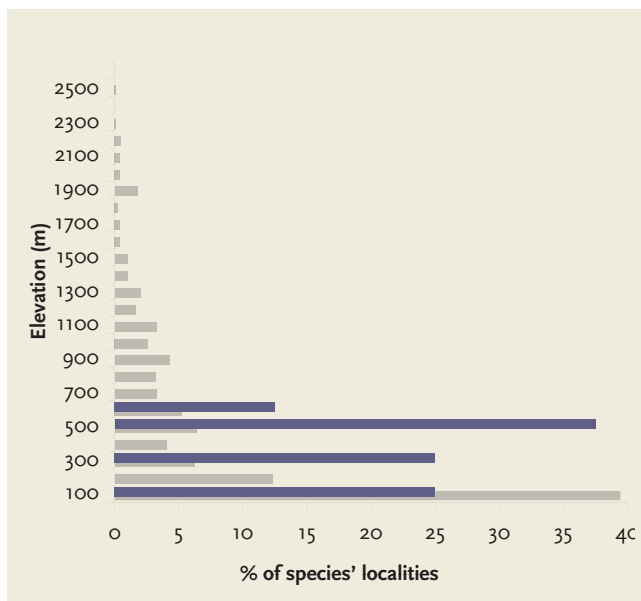
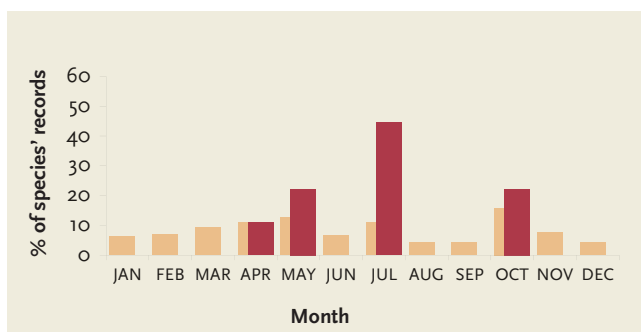
The first record of a sole male of a new undescribed *Macromidia* from the island by Matjaž Bedjanič and Ali Šalamun in 2001 was quite a surprise (BEDJANIČ, 2004); Nancy van der Poorten found it again in 2007 and finally described both the male and female (VAN DER POORTEN, 2012). Its subspecific name honours Rohan Pethiyagoda, naturalist, scientist, writer and founder of the Wildlife Heritage Trust, under which the first book dedicated solely to the dragonflies of Sri Lanka, by Terence de Fonseka, was published at the break of the millennium (DE FONSEKA, 2000).

M. donaldi pethiyagodai is characterized by a metallic emerald green thorax, with three conspicuous ventral yellow stripes, pointedly prolonged laterally almost to the middle of the sides of the thorax and by the black abdomen, which is dorsally



only very finely marked with a yellow line. So far it has been found only in the wet zone of Sri Lanka. It was first found in October 2001 at a small stream below Diyaluma Falls in the south-east of the country (BEDJANIČ, 2004). Later, it was recorded a few times in and around the Sinharaja Biosphere Reserve at small streams by Nancy van der Poorten and Matjaž Bedjanič in May 2003, July 2007 and April 2008. In May 2003, Matjaž Bedjanič recorded a juvenile male at a stream in the suburbs of Ratnapura, and in July 2009, photographed a female resting in bamboo overhanging the Kelani River pool in Kithulgala, its northernmost known locality.

Due to its wildly swift nature, this endemic Shadow-emerald is often overlooked. However, small streams and rivulets in primary and secondary forests in the southwestern part of the island are the type of habitat under threat. Therefore, until new data and knowledge are available, *M. donaldi pethiyagodai* is assessed as globally threatened, ranked in the category of Endangered under the IUCN criteria.



| | |
|-----------------------------|---------------|
| Number of all localities: 8 | after 1990: 8 |
| Number of all records: 9 | after 1990: 9 |

| |
|---|
| Extent of Occurrence (EOO): 2,533 km ² |
| Area of Occupancy (AOO): 24 km ² |

% of records per period:

1850-1920 1921-1990 1991-2013



IUCN Red List Criteria: EN B1ab(iii)+2ab(iii)

IUCN Red List Category: ENDANGERED

References & Synonymy:

Macromidia donaldi pethiyagodai, van der Poorten, 2012, Int. J. Odonatol. 15(2): 99-106, figs. 1-7.

Macromidia sp. nov. – BEDJANIĆ (2004): 288; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23; *Macromidia donaldi pethiyagodai* – VAN DER POORTEN (2012a): 99-106, figs. 1-7; NIZAM (2012): www.island.lk;

Faunistic records: APPENDIX, page 304;





LIBELLULIDAE Chasers



Hylaeothemis fruhstorferi (Karsch, 1889)

Fruhstorfer's Junglewatcher

ENDEMIC

Hylaeothemis fruhstorferi is one of the rarest representatives of its family, known only from several decades-old records at Belihul Oya and recent observations clustered in the Sinharaja Biosphere Reserve.

The species was described by F. Karsch in 1889, based on a single male specimen collected in Sri Lanka by the German explorer, insect trader and entomologist Hans Fruhstorfer (KARSCH, 1889a). A description of a supposed *H. fruhstorferi* female from south India followed by RIS (1913b) but FRASER (1946) recognized that these populations actually belong to two distinct species—*H. indica*, which occurs in south India and *H. fruhstorferi* which is endemic to Sri Lanka. Males of *H. fruhstorferi* are recognized by their elegant slender stature and by the dark metallic bluish-green frons and black body ornamented with contrasting light markings on the thorax and abdomen. These markings are citron yellow in young insects but turn bluish in the adult. Females are very similar to young males as far as colour pattern is concerned but are stouter and recognized at a glance by the characteristic lateral expansions towards the end of the abdomen.

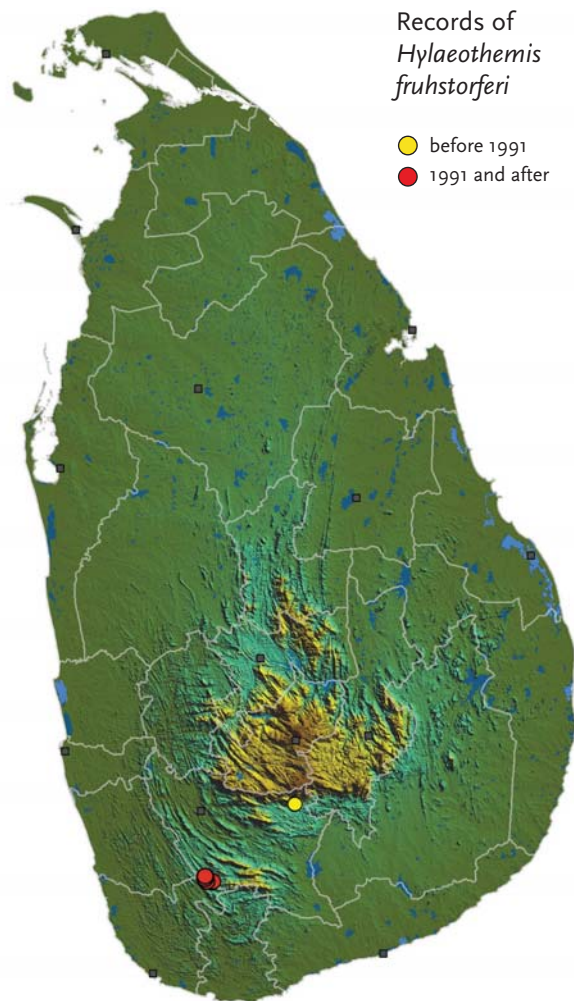
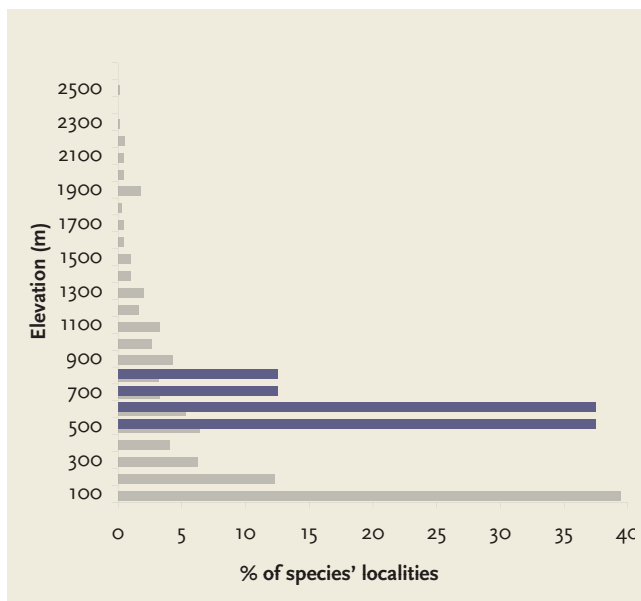
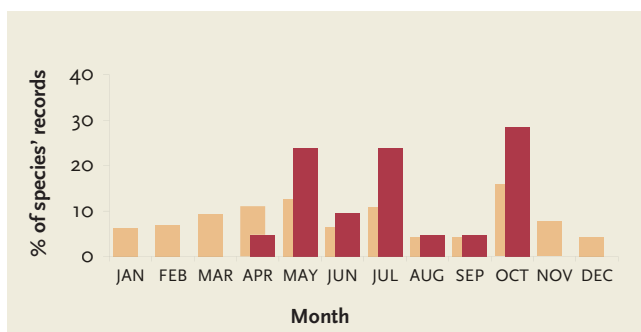
The following note by FRASER (1936), considering the Indian and Sri Lankan populations as conspecific, represented the only known information on the species' behaviour and biology until the break of the millennium: "...Breeds in the seepages from marshes along the banks of mountain streams at altitudes of about 2,000 ft., and will be found settled on herbage in such situations. Its flight is short and unsustained, resembling in this respect the Gomphines, this resemblance being further heightened by the yellow markings in the subadult condition... The type, in the Berlin Museum, is from Belihul-Oya, Ceylon, where I found it common in May."

Nobody has found this enigmatic species in Belihul Oya since, and only in September 2004 was



the first female photographed by Amila Salgado in the Sinharaja Biosphere Reserve. Additional records and photographs followed from the Kudawa side of Sinharaja by different observers in later years, but all from a cluster of very close-lying localities, along the borders of small streams at the rainforest edge at elevations between 500 and 700 metres. The majority of *H. fruhstorferi* records originate in May, July and October, but June, August and September also belong to the flight season of the adults.

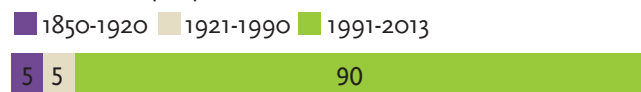
Being an extremely rare endemic species of pristine natural habitats, *H. fruhstorferi* has been listed among globally threatened species already by BEDJANIČ (2006a) and Dow (2009b), who assessed it as Endangered. On the national level the species has been ranked as Critically Endangered by VAN DER POORTEN & CONNIFF (2012). Unfortunately, due to its extremely limited distribution, various ongoing human pressures on streams and rivers in southwestern Sri Lanka as well as fragmentation of primary and secondary rainforests, the same view has to be adopted also for the global level.



| | |
|-----------------------------|----------------|
| Number of all localities: 8 | after 1990: 7 |
| Number of all records: 21 | after 1990: 19 |

| | |
|-----------------------------|---------------------|
| Extent of Occurrence (EOO): | 104 km ² |
| Area of Occupancy (AOO): | 16 km ² |

% of records per period:



IUCN Red List Criteria: CR B1ab(ii,iii,iv)+2ab(ii,iii,iv)

IUCN Red List Category: CRITICALLY ENDANGERED

References & Synonymy:

Tetrathemis fruhstorferi, Karsch, 1889, Ent. Nachr. 15(20): 321-323.

Tetrathemis fruhstorferi - KARSCH (1889a): 321-323; KARSCH (1889b): 385; KIRBY (1890): 44; KIRBY (1894): 556; *Hylaeothemis fruhstorferi* - RIS (1909): 65; RIS (1913b, *pars*): 1050; LAIDLAW (1924): 343; FRASER (1936): 261-262, fig. 79; FRASER (1946): 99; LAIDLAW (1951): 80, 81; LIEFTINCK (1955): 77; LIEFTINCK (1971a): 206; DAVIES & TOBIN (1985): 80; VAN TOL (1992): 108; BRIDGES (1994): VII.93; DE FONSEKA (2000): 13, 140, 142, 144-145, 214, fig. B94; IUCN SRI LANKA (2000): 26; BEDJANIĆ (2004): 284, 288-289; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23, 25; BEDJANIĆ et al. (2007): 17, 154-155; IUCN SRI LANKA & MOENR (2007): 46; DOW (2009b): www.iucnredlist.org; VAN DER POORTEN (2009b): 56; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 8; *Hyaeothemis frustorferi* (sic!) - FERNANDO (1964): 191; FERNANDO (1990): 187; *Hylaeothemis fruhstorferi fruhstorferi* - TSUDA (1986): 145, 227; BEDJANIĆ (1998): 9, 44-45, 60, 63, 67, 78;

Faunistic records: APPENDIX 2, page 304;

Tetrathemis yerburii Kirby, 1894

Yerbury's Elf

ENDEMIC

Due to its small size and beautiful combination of greenish-turquoise eyes, metallic green face, contrasting inky black body with citron yellow markings and apices of wings broadly tipped with black, *Tetrathemis yerburii* is simply adorable. It lives a quite inconspicuous and hidden life around small jungle pools along rivers, streams and marshes and its colours keep it well camouflaged when it sits on the rich surrounding vegetation of its home water-hole.

For years, the distribution of this tiny endemic was shrouded in mystery. It was KIRBY (1894) who described it and excellently figured a female, based on the rich entomological collection of Col. J. W. Yerbury that was presented to the Natural History Museum in London. Two males and a female of *T. yerburii* from Kandy were among the many interesting and new dragonfly species in this collection. Some decades later, LAIDLAW (1924) added Hatton to the species' localities, while LIEFTINCK (1971a) reported it from the surroundings of Hanguranketa, southeast of Kandy. With additional valuable unpublished records from the Kalatuwawa Reservoir, Laxapana and Udawatakelle Sanctuary in Kandy gathered in 1970 and 1976 by the Smithsonian Institution researchers, this was all that was known about the species until recently.

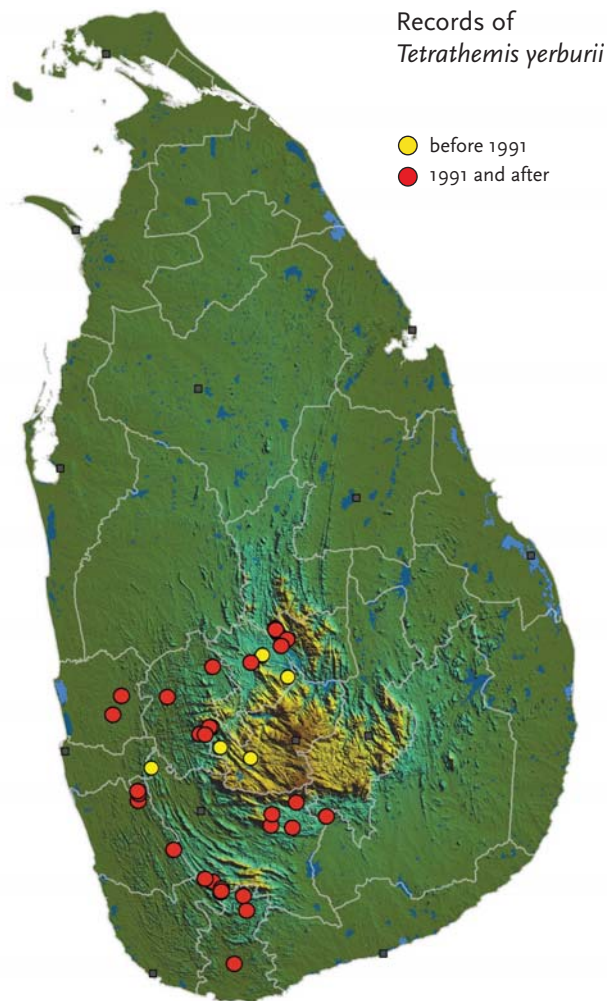
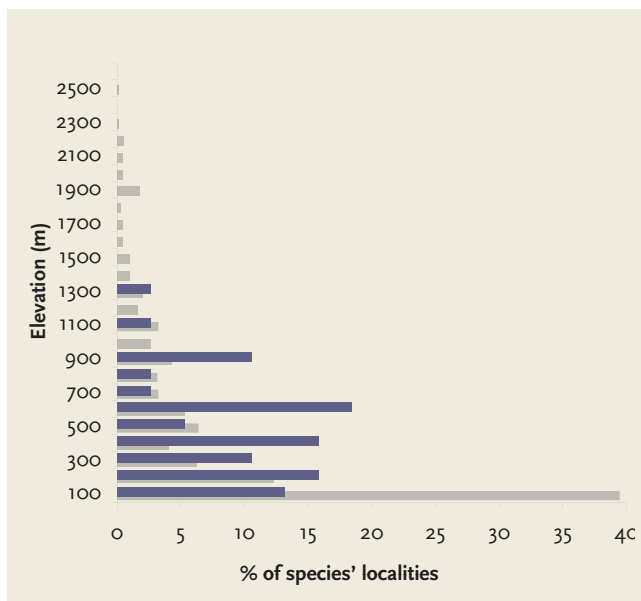
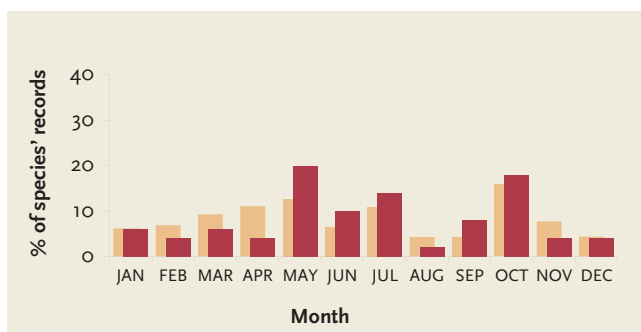
Only over the last few years have the number of species' records increased significantly, also thanks to reports of naturalists impressed by its photogenicity. As almost a rule in Sri Lankan endemic dragonflies, the distribution of *T. yerburii* is limited to the southwestern part of the island. It predominantly occurs in the lowland and lower hills, in areas with at least some forest remains nearby. Adult insects can be met with the whole year round, but May to July and September to October seem to be the best months to observe it.

Very little is known of the biology and behaviour of *T. yerburii*, but Karen Conniff took a remarkable



series of photographs of a female ovipositing. In contrast to the majority of other exophytic dragonflies, which oviposit by tapping the water or vegetation with its abdomen and washing off the eggs in this manner, *Tetrathemis* females are exceptional in attaching their egg clusters to roots, leaves or twigs overhanging the water body into which the newly hatched larvae drop only later. This very peculiar egg-laying behaviour deserves a special detailed study, like the one published by KIRAN & KAKKASSERY (2007) on its Indian congener *T. platyptera*.

Since the species inhabits a special type of habitat which is under threat due to water pollution and extraction for domestic and agricultural use, it is clearly endangered and not in expansion as a misinterpretation of recent data increase might suggest. Therefore, *T. yerburii* unfortunately still remains among the globally threatened Sri Lankan endemics. However, in contrast to BEDJANIĆ (2006a) and VAN DER POORTEN & CONNIFF (2012) who rated it as Endangered, it is assessed as a Vulnerable species according to the IUCN criteria.



| | |
|-------------------------------------|-----------------------|
| Number of all localities: 38 | after 1990: 32 |
| Number of all records: 49 | after 1990: 39 |

| |
|---|
| Extent of Occurrence (EOO): 7,908 km² |
| Area of Occupancy (AOO): 132 km² |

% of records per period:

1850-1920 1921-1990 1991-2013

| | | |
|----------|-----------|-----------|
| 6 | 14 | 80 |
|----------|-----------|-----------|

IUCN Red List Criteria: VU B1ab(iii)+2ab(iii)

IUCN Red List Category: VULNERABLE

References & Synonymy:

Tetrathemis yerburii, Kirby, 1894, J. linn. Soc., Zool. 24: 556, pl. XLI-fig. 4.

Tetrathemis yerburii - Kirby (1894): 556-557, pl. XLI-fig. 4; TSUDA (1986): 168, 229; BRIDGES (1994): VII.255; BEDJANIĆ (1998): 9, 45, 60, 63, 78; IUCN SRI LANKA (2000): 27; BEDJANIĆ (2004): 284, 288-289; BEDJANIĆ (2006a): www.iucnredlist.org; BEDJANIĆ (2006b) in BAMBARADENIYA (2006): 23, 25; BEDJANIĆ et al. (2006): pl. 12; IUCN SRI LANKA & MOENR (2007): 46; VAN DER POORTEN (2009b): 56; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 8; *Tetrathemis yerburyi* - RIS (1909): 45, 52; LAIDLAW (1924): 343; FRASER (1918): 619, 620; FRASER (1936): 250, 251-252; LAIDLAW (1951): 80; LIEFTINCK (1955): 77; KIMMINS (1968): 295; LIEFTINCK (1971a): 202, 206; DAVIES & TOBIN (1985): 84; VAN TOL (1992): 236-237; DE FONSEKA (2000): 13, 142, 145-146, 217, fig. B108; DE SILVA WIJEYERATNE et al. (2003): pl. 4; KIRAN & KAKKASSERY (2007): 351; SHARMA et al., (2009): 49; *Tetrathemis yerburyii* - BEDJANIĆ et al. (2007): 17, 156-157; WCSG (2009): 11;

Faunistic records: APPENDIX 2, page 305;

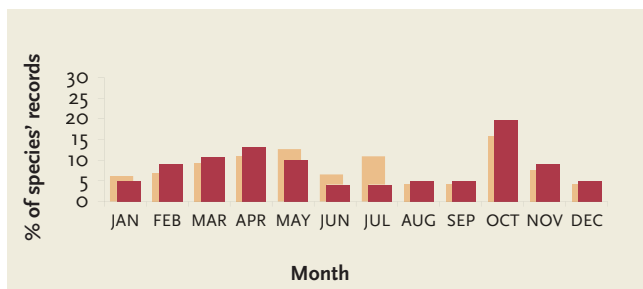
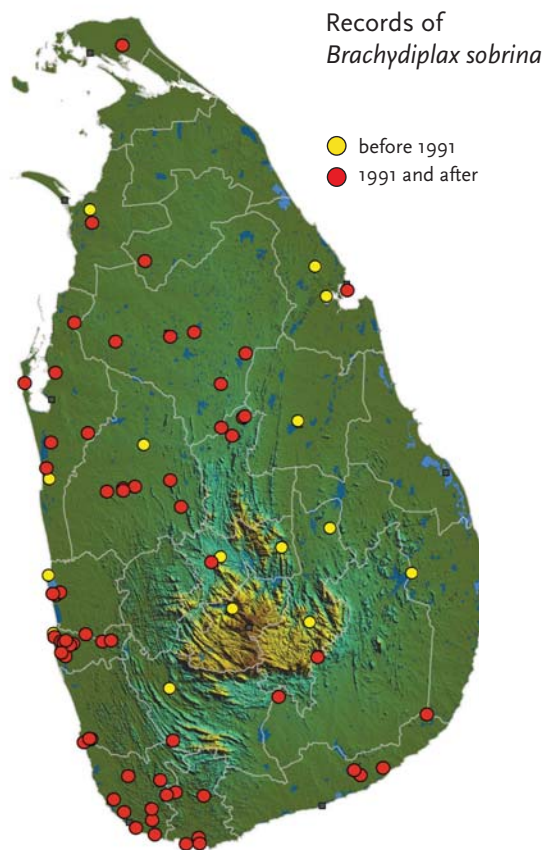
Brachydiplax sbrina (Rambur, 1842)

Sombre Lieutenant

Richly vegetated lotus ponds and reservoirs are the favourite environment of *Brachydiplax sbrina*. This small, rather shy, light bluish, pruinose dragonfly can be a difficult one to identify, especially when not fully mature. Juvenile males are somewhat similar to the opposite sex, being yellow and dark metallic green on the thorax and black on the abdomen, while with age the colours darken and the amount of light blue pruinescence extends on the body. However, the prominent metallic blue frons as well as at least a shade of dark metallic colour on the thorax are helpful in determination.

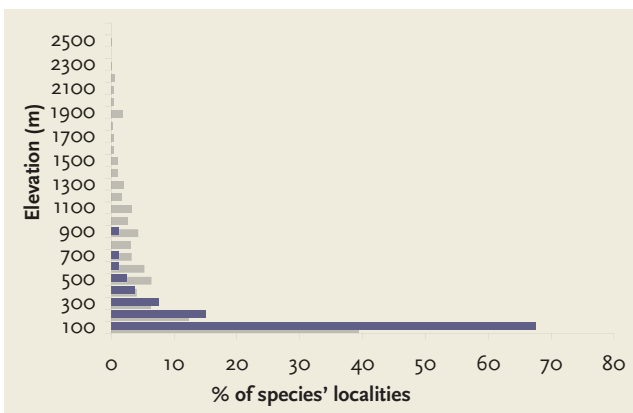
In contrast to the males, which like to perch and fly directly above water, the females usually tend to stay in the brush some distance from the breeding areas and appear only to mate and oviposit. Unlike other dragonflies, their small eggs are turquoise coloured.

B. sbrina is found throughout the year along vegetated areas of reservoirs, in weedy ponds, channels, lagoons and swamps. It is a lowland species and individual records from the hills are exceptional. Lack of records in the east of the island reflects less intensive fieldwork activities. Apart from Sri Lanka, the species occurs through the whole of India, as well as in Nepal, Bangladesh, Myanmar and Thailand.



Number of all localities: **83** after 1990: **64**

Number of all records: **134** after 1990: **112**





Cratilla lineata calverti Förster, 1903

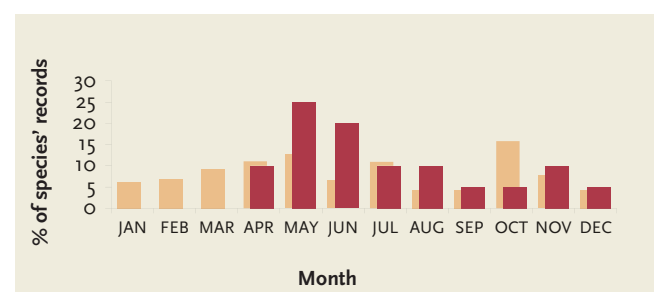
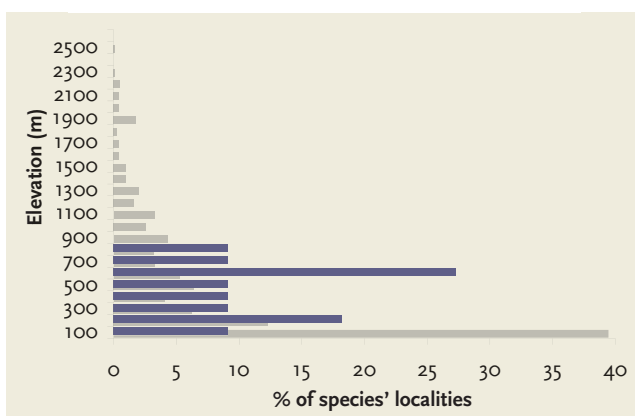
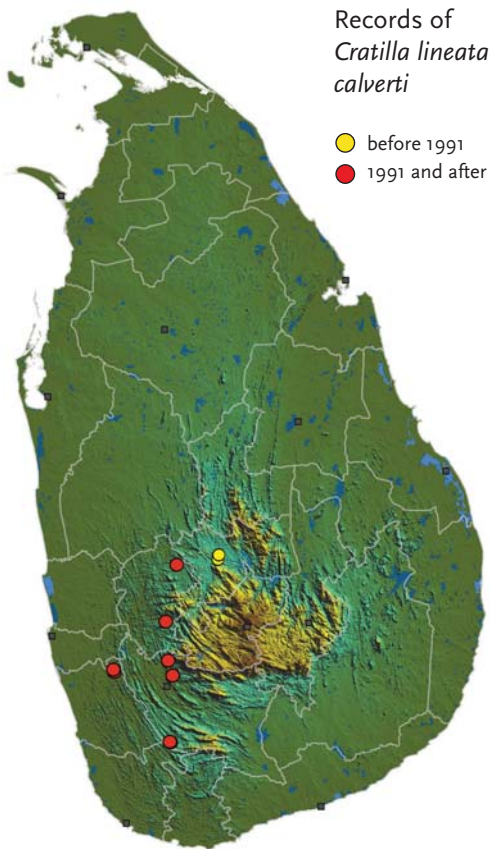
Pale-faced Forestskimmer

As the common name suggests *Cratilla lineata calverti* is a forest dwelling insect of which very little is known and in fact, it is one of the rarest representatives of the family in Sri Lanka.

When seen straight on, the face with a striking creamy white labium and labrum, with a metallic blue frons, can be recognized at a glance. Otherwise, it is dark coloured with very thin yellow stripes along the abdomen, and with three conspicuous lateral stripes on the steely or bronzed-black thorax which is also marked in front of the wings with a yellow mid-dorsal carina.

C. lineata calverti is seen only in good secondary or primary forest patches with small seepages nearby and its flight season is from April to December. A few old published records are known from around Kandy (LAIDLAW, 1924; LIEFTINCK, 1955), while recently the species has been found in Bodhinagala, Mawanella, Kithulgala, Gilimale and Palabaddala, while Sinharaja is probably the best place for observation.

C. lineata calverti is sensitive to habitat changes and on the national level it has been ranked as Endangered by VAN DER POORTEN & CONNIFF (2012). It is also known from India, Myanmar and Thailand.



Number of all localities: **12**

after 1990: **8**

Number of all records: **21**

after 1990: **14**

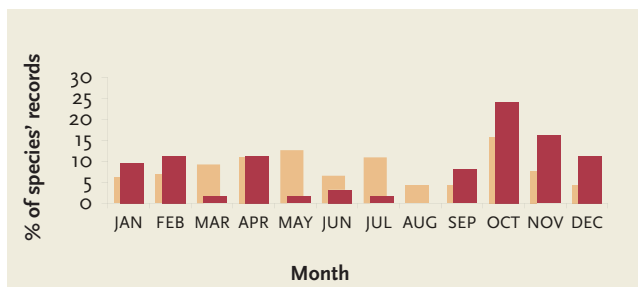
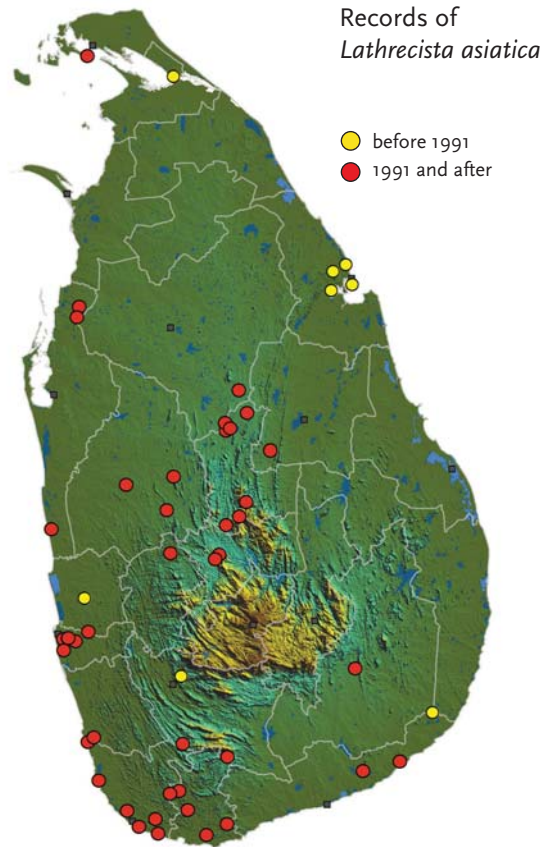
Lathrecista asiatica asiatica (Fabricius, 1798)

Pruinosed Bloodtail

It is not very hard to guess that the English name of *Lathrecista asiatica asiatica* is derived from the characteristic long thin red abdomen and the purplish blue thorax of older males. The abdomen reddens and the thorax becomes pruinose with age, almost completely masking the characteristic thoracic stripes. Young males and rare androchrome females have a bright orange to reddish colour on the abdomen, terminating with black on the caudal segments. More commonly, the abdomen of the female is coloured a rich olivaceous-brown.

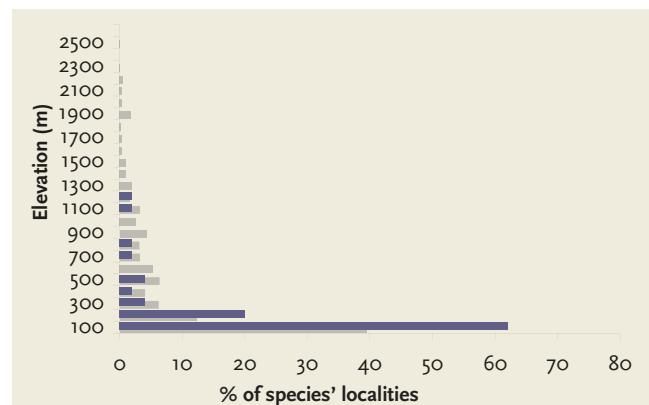
L. asiatica is a very shy and not very common insect. It is found predominantly in the lowlands of the wet, intermediate and dry zones and it seems that the wetter part of the year between September and February is its main flight season. Only additional field research can answer the question if *L. asiatica* is commoner in the northern and eastern lowlands of the island than its currently known distribution suggests.

The nominotypical subspecies is widely distributed from Sri Lanka, across India and the Malay Peninsula to East Asia, Indonesia and the Philippines. Additional subspecies occur further to the east.



Number of all localities: **50** after 1990: **42**

Number of all records: **75** after 1990: **63**





Lyriothemis defonsekai

Lyriothemis defonsekai van der Poorten, 2009

Vermilion Forester

ENDEMIC

The first sighting of beautiful *Lyriothemis defonsekai* might be of a male sitting on a branch, just out of reach, in a shaft of sunlight in the opening of a tall dark dipterocarp rainforest. The female will be close by, perhaps sitting higher, recognized easily from a frog's perspective by its characteristic short and broad abdomen.

Found so far in only one small area of the Sinharaja Biosphere Reserve, the species is unmistakable due to the brilliant vermilion red colour of the male's abdomen. The latter is broad, flattened and finely decorated with yellow and lined with black along the sutures, dorsal carina and more extensively on the last two segments, with black anal appendages. The thorax is citron-yellow with two converging broad black antehumeral stripes and a broad black median lateral stripe interrupted with yellow spots. The female is similar in body and thoracic markings, but with a broader yellow abdomen, longitudinally traversed by a thick black mid-dorsal carina and two dorsolateral black stripes.

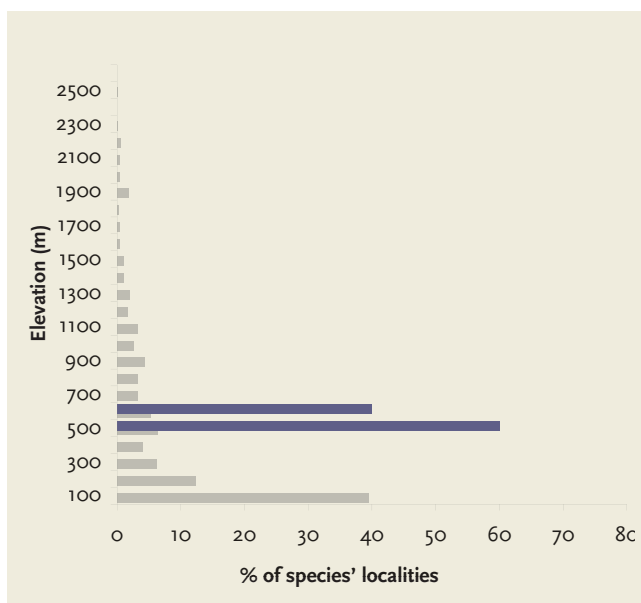
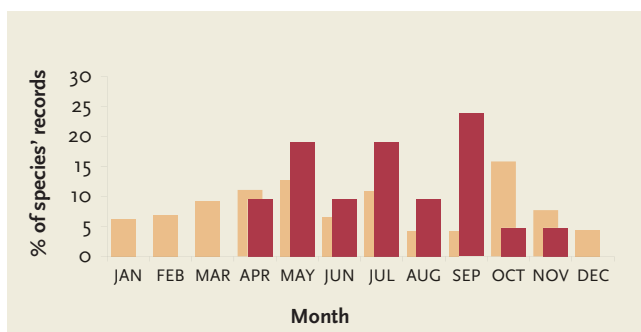
L. defonsekai was described only in 2009 by Nancy van der Poorten and represents one of the finest recent additions to the dragonfly fauna of the island (VAN DER POORTEN, 2009a). Its specific name honours the work of Terence de Fonseka, the author of *The dragonflies of Sri Lanka*, which was the first book dealing exclusively with the dragonflies of the island and which belongs to the most important ground works of Sri Lankan Odonatology (DE FONSEKA, 2000).

As summarized by VAN DER POORTEN (2009b) all species' records originate from closely lying localities along a walking trail that is bordered by a perennial stream in the Sinharaja Biosphere Reserve, near the Kudawe entry point. *L. defonsekai* has been recorded here from April to November by Amila Salgado, Nancy van der Poorten, Gehan de Silva Wijeyeratne,



Karen Conniff, Sampath Gunasinghe and Mahesha Wijewardana. The vegetation at the spot consists mainly of dipterocarps with tree ferns, bamboo and pitcher plants. Females and males are seen perched on vegetation one to two metres above the ground and no other data on their behaviour or biology is available. The early larval stages are known from laboratory studies (VAN DER POORTEN, 2009a), but it is not known where they breed in the field. As reported for some other species of the genus, it is possible that the larvae breed in phytotelmata, which are common in the dipterocarp forest.

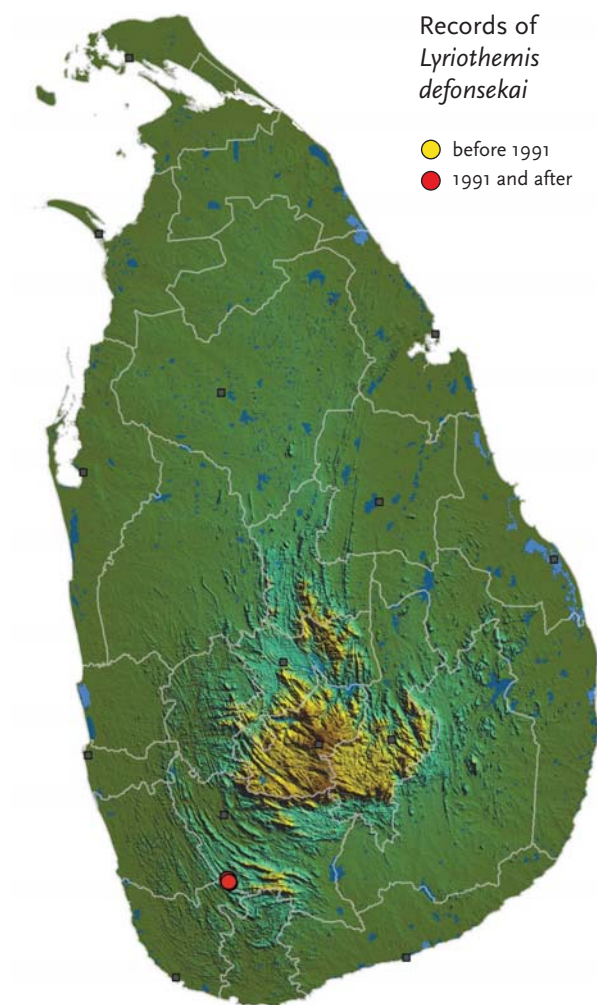
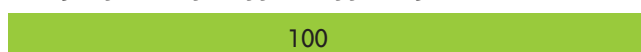
Although the only discovered habitat of *L. defonsekai* is fortunately located in a famous protected area, the species is potentially endangered due to its extreme rarity, small population and sensitivity of primary forest ecosystem. In the border sections of the reserve, small scale logging, undergrowth clearing and encroachment is still taking place. In the National Red List (VAN DER POORTEN & CONNIFF, 2012), as well as in the present publication, it is assessed as Critically Endangered according to IUCN criteria.



| | |
|-----------------------------|----------------|
| Number of all localities: 6 | after 1990: 6 |
| Number of all records: 19 | after 1990: 19 |

% of records per period:

1850-1920 1921-1990 1991-2013



| | |
|-----------------------------|-------------------|
| Extent of Occurrence (EOO): | 8 km ² |
| Area of Occupancy (AOO): | 8 km ² |

IUCN Red List Criteria: CR B1ab(iii)+2ab(iii)

IUCN Red List Category: CRITICALLY ENDANGERED

References & Synonymy:

Lyriothemis defonsekai, van der Poorten, 2009, Int. J. Odonatol. 38(1): 15-27, figs. 1-11.

Lyriothemis defonsekai - VAN DER POORTEN (2009a): 15-27, figs. 1-11; VAN DER POORTEN (2009b): 56-57; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 1-2, 8; EMILIYAMMA et al. (2013): 73;

Faunistic records: APPENDIX 2, page 305;

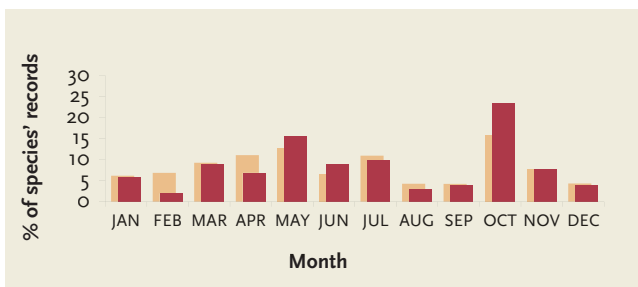
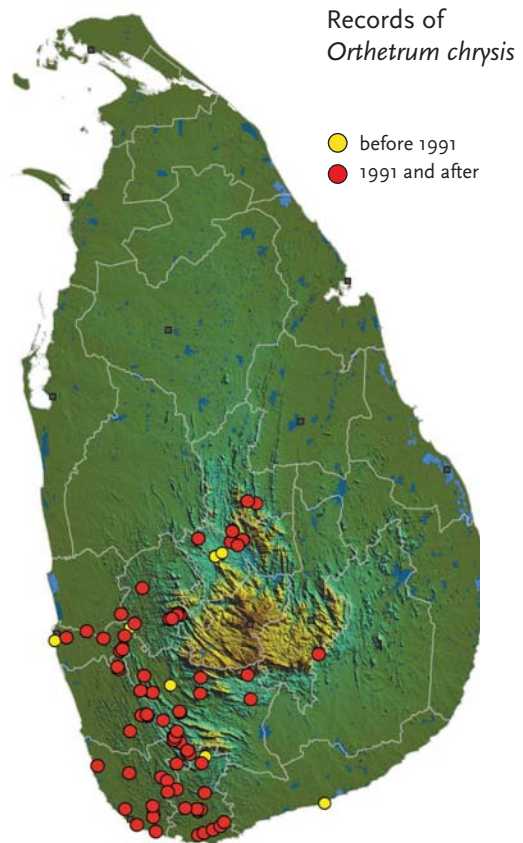
Orthetrum chrysis (Selys, 1891)

Spine-tufted Skimmer

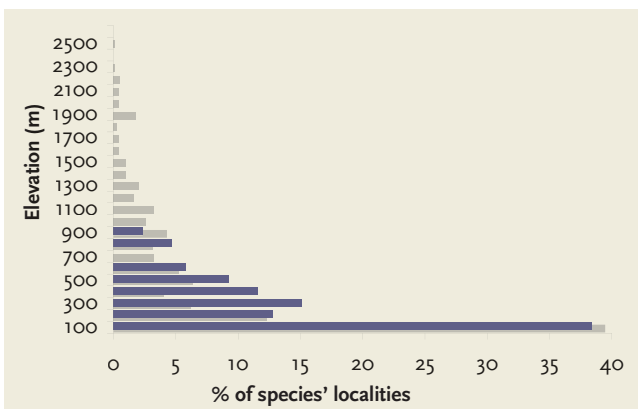
A combination of the male's dark brown head, deep brown thorax and bright red abdomen is a first good indicator of *Orthetrum chrysis*. The common name of the species comes from a characteristic stiff tuft of black hairs on the ventral side of the abdomen in front of the secondary genitalia that can be viewed from the side. Both sexes have a small amber spot at the base of the wings, which are slightly enfumed brown in the females. The females are stouter insects, similar in colouration to its congeners and with lateral expansions on the eighth abdominal segment.

In Sri Lanka, the species is not rare, but is less common than most of its congeners and its distribution is limited to the lowlands and mid-hills of the southwestern and central part of the island. It is usually found throughout the year next to small brooks, streams, pools and marshes, often in the vicinity of forested areas.

Its distribution extends from Sri Lanka, over India, the Malay Peninsula, east China and Hong Kong to the Philippines and Indonesia.



| | |
|-------------------------------------|------------------------|
| Number of all localities: 89 | after 1990: 77 |
| Number of all records: 125 | after 1990: 106 |





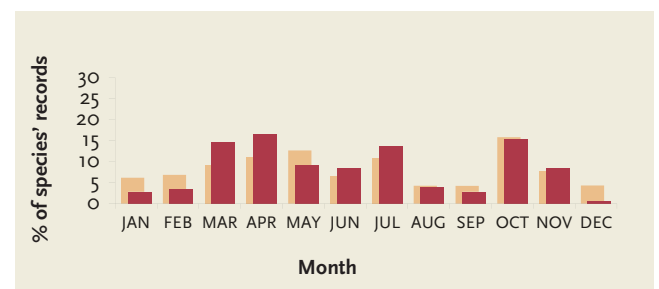
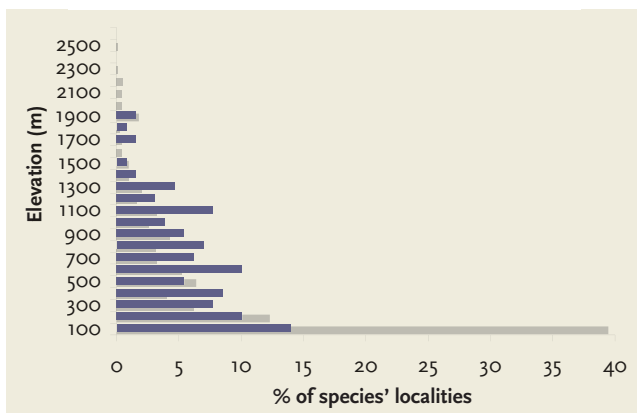
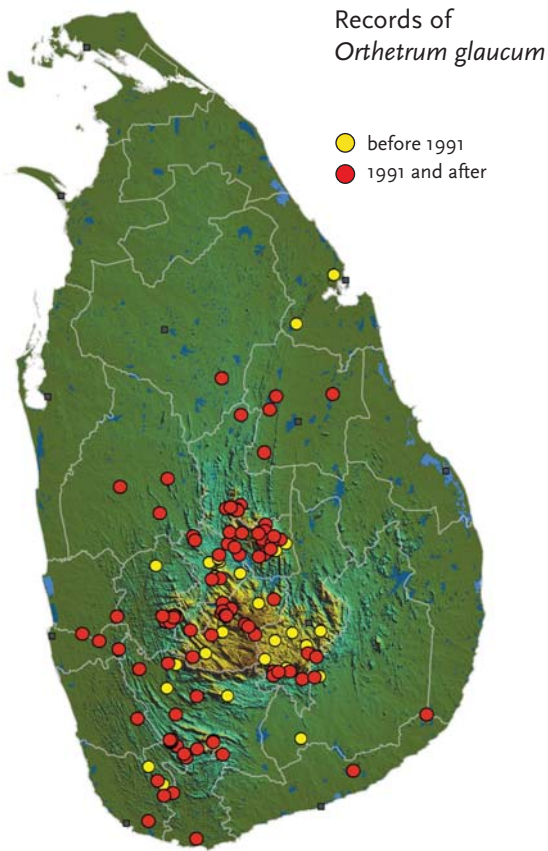
Orthetrum glaucum (Brauer, 1865)

Asian Skimmer

Although the females of almost all Skimmers found in Sri Lanka are superficially similar, the males differ more in colouration. In contrast to the bright red colouration of its predecessor, the mature male of *Orthetrum glaucum* is pruinosed pale blue over almost all of its body, but the amount of pruinescence varies according to age. From the two other blue congeners, it is differentiated by its dark blue eyes, black face, unpruinosed last two or three segments of abdomen and a small basal patch of dark amber in the wings. The female, similar to the juvenile male, is dark brown with pale yellow markings across the thorax and a light brown abdomen with dark brown sutures.

In Sri Lanka, *O. glaucum* is evenly distributed at all altitudes, from the plains up to the mountains. However, it seems that it avoids the lowlands near the coast and the dry northern and eastern parts of the island. It is usually observed hovering over small marshes, brooks, streams and pools, frequently settling on perches some decimetres from the ground. The females rest at a distance from water sources before mating, usually among short vegetation where small streams flow nearby.

It is distributed from Sri Lanka and India as far as Japan, the Philippines, Indonesia and Papua New Guinea in the east.



Number of all localities: 131

after 1990: 97

Number of all records: 185

after 1990: 136

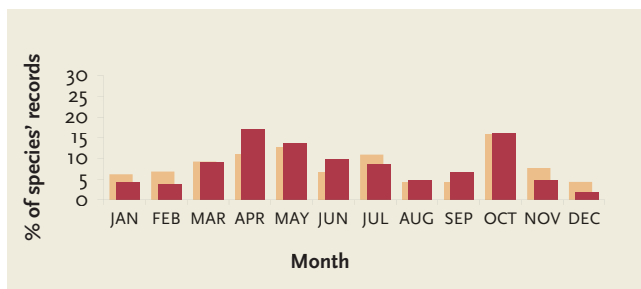
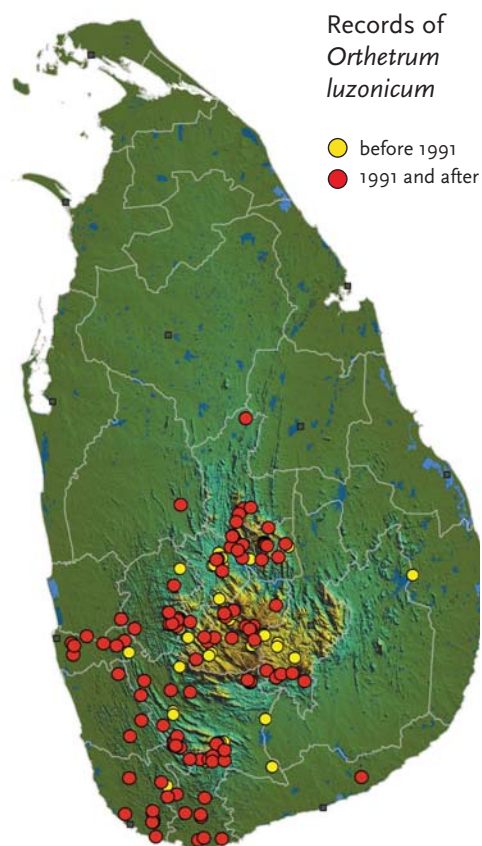
Orthetrum luzonicum (Brauer, 1868)

Marsh Skimmer

Male *Orthetrum luzonicum*, with its slender pruinosed blue body, is similar to *O. glaucum*. Variations in the amount of pruinescence according to the dragonfly's age in both species often complicate determination. However, the head characters of *O. luzonicum* are different—it has light blue to greenish eyes and a pale bluish to dirty yellow face. The females are similar to the young juvenile or sub adult males, having a greenish yellow abdomen, dark grey mid-dorsal stripe and sutures and characteristic dirty white last segment of the abdomen and anal appendages.

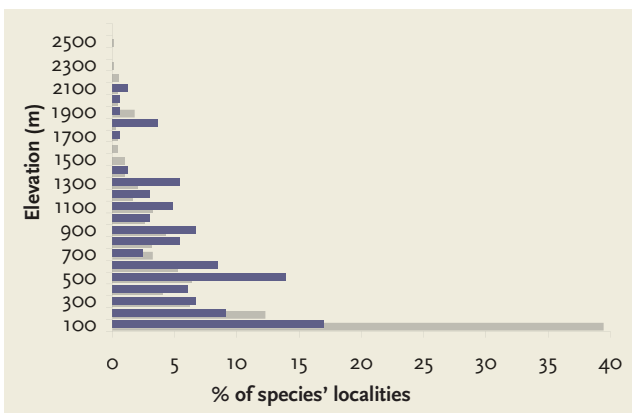
The species is commonly found in small marshes and swampy areas, while the females usually dwell along vegetated paths some distance from the water. It occurs at all elevations, from the lowlands to the mountains, but it is distributed exclusively in the wet southwestern and central parts of the island with only rare records from the dry zone.

Orthetrum luzonicum has an extensive range from Afghanistan in the northeast, throughout Southeast Asia, reaching Japan, Hong Kong, Taiwan, the Philippines and Indonesia in the east.



Number of all localities: **169** after 1990: **121**

Number of all records: **229** after 1990: **166**



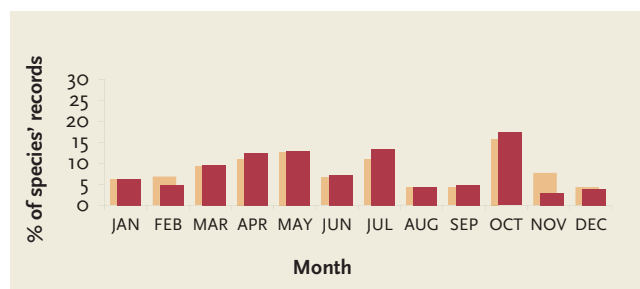
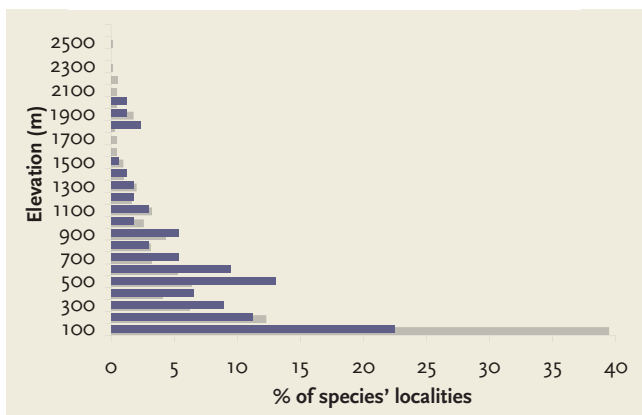
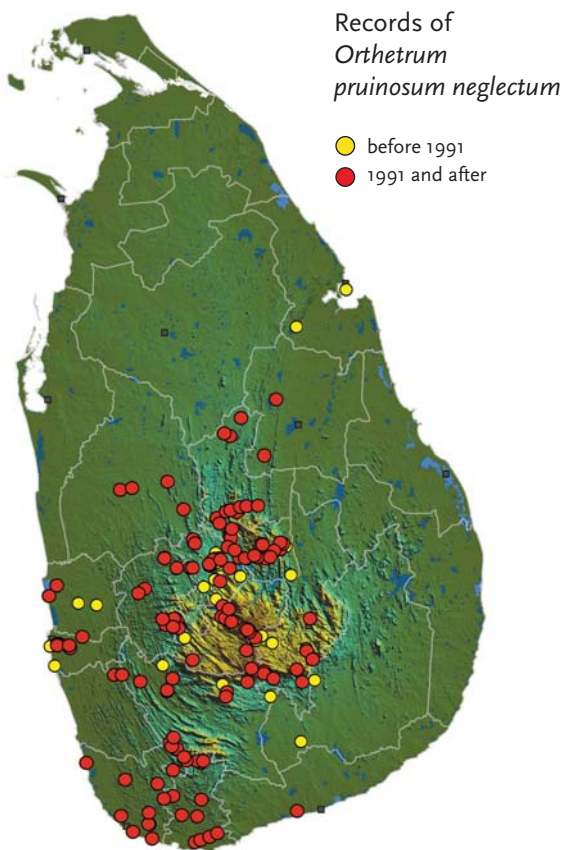


Orthetrum pruinsum neglectum (Rambur, 1842)

Pink Skimmer

The male's pinkish red abdomen with a purplish thorax and dark brown patches at the base of the hind wings are easily recognized identification marks for *Orthetrum pruinsum neglectum*. It somewhat resembles its close relative *O. chrysis* which, however, has a bright red abdomen that never shows a violaceous tint. Both species can be found in the same areas, but *O. pruinsum neglectum* is more common at all elevations near swampy wetlands, pools and slowly flowing streams in both open and vegetated areas. The females are rarely seen with the males and much like other skimmer relatives they have expansions on the eighth segment of the abdomen and dwell in nearby jungle or forest patches before mating.

In Sri Lanka, this robust Skimmer is widely distributed in the southwestern and central parts of the island, but is almost completely absent in the dry areas. It is common throughout Asia, from Afghanistan in the southwest throughout India, Nepal, China, Hong Kong and Japan in the east.



Number of all localities: **170**

after 1990: **132**

Number of all records: **230**

after 1990: **175**

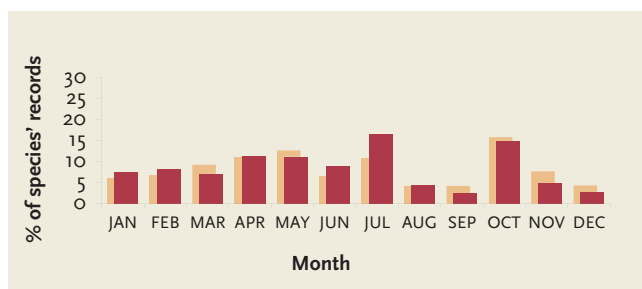
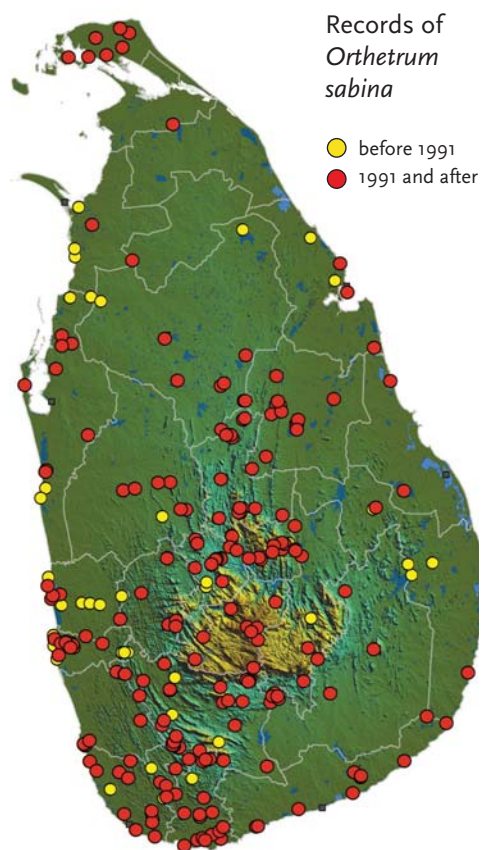
Orthetrum sabina sabina (Drury, 1773)

Green Skimmer

Unmistakable, with an extraordinary bulge at the base of the abdomen, which is then abruptly slimmed and compressed laterally to the end, *Orthetrum sabina* counts among the more common and most successful dragonfly species. This large voracious Skimmer has a vast range and is also seen in eastern Algeria and the Greek islands in the Aegean Sea in the west, throughout the Middle East and the whole of Asia to Japan, New Guinea, Samoa and Australia in the east.

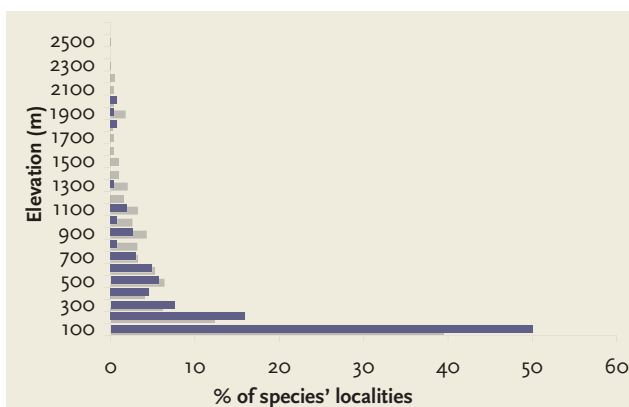
The markedly swollen first abdominal segments are characteristic of both sexes, which are very alike also in their greenish, yellow to whitish and black colouring and markings. Fast flying and highly predaceous, they are the vanquishers of many other dragonfly and damselfly species.

In Sri Lanka, *O. sabina* is commonly found all over the island and in all seasons. It even won the prestigious title of the commonest in the Anisoptera suborder. The species inhabits all types of wetlands and although being generally a dragonfly of lowlands and mid hills, it is no surprise to meet it in the mountains as well. It is safe to say that *O. sabina* belongs to the very few dragonfly species in which conservation concerns will never arise.



Number of all localities: **271** after 1990: **214**

Number of all records: **409** after 1990: **322**





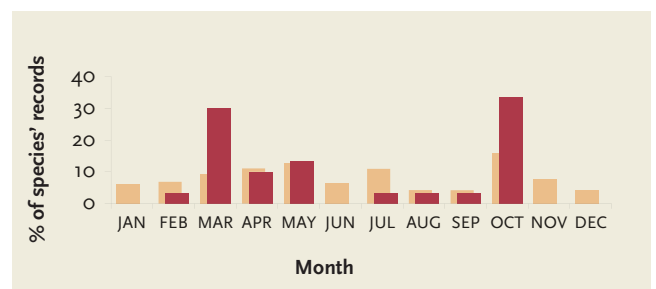
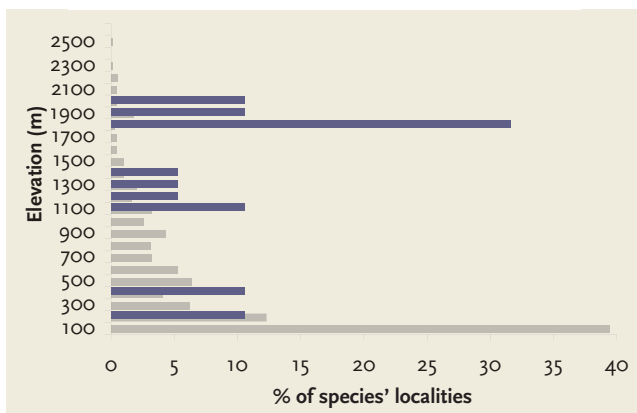
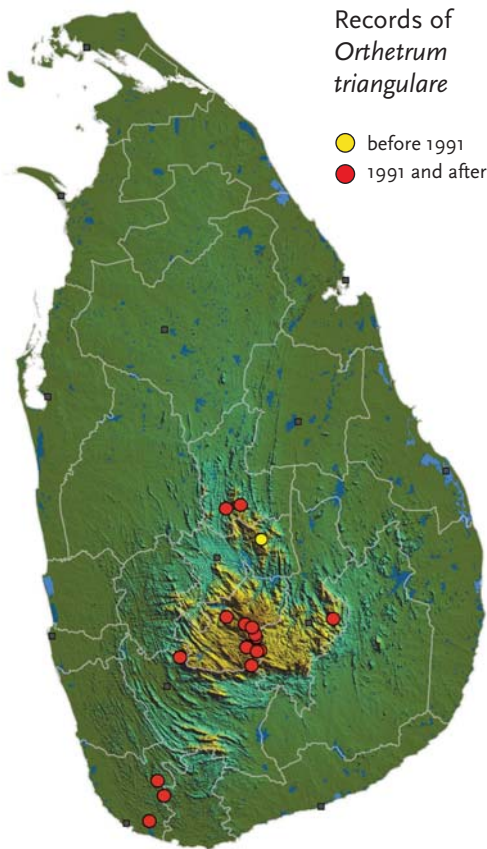
Orthetrum triangulare triangulare (Selys, 1878)

Triangle Skimmer

The characteristic angular patch of black in the hind wing, dark thorax and sharply contrasting light blue pruinosed abdomen down to the seventh abdominal segment, where the colour changes to charcoal-black, pinpoints the male of *Orthetrum triangulare* at a glance. Females are dark brown, the thorax is brownish black with two wide yellow stripes, the base of the hind wing is tinted with golden-yellow and the broad abdomen has ventro-lateral expansions at the eighth segment.

In Sri Lanka, *O. triangulare* is quite rare and VAN DER POORTEN & CONNIFF (2012) even listed it among Endangered species on the National Red List. This robust Skimmer is found almost exclusively at higher elevations e.g. in the Knuckles, in the central hills around Nuwara Eliya and at Horton Plains. Over one-third of the observations originate from Hakgala Botanic Gardens. Here they mate around small pools and the males attentively hover above egg-laying females, chasing away everything that flies nearby. Isolated southern records from Nakiyadeniya, Hiyare Lake and Kanneliya (WCSG, 2008) do not fit into the general ecological and distributional frame of *O. triangulare* and should be confirmed with future research.

Apart from Sri Lanka, the range of the nominotypical subspecies extends from Afghanistan in the west across Pakistan, Bhutan, Nepal, India, Laos, Myanmar, Thailand, Vietnam, China, Hong Kong and Taiwan in the northeast.



Number of all localities: 21

after 1990: 17

Number of all records: 37

after 1990: 33

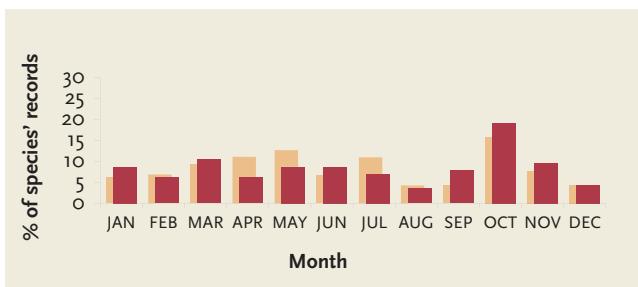
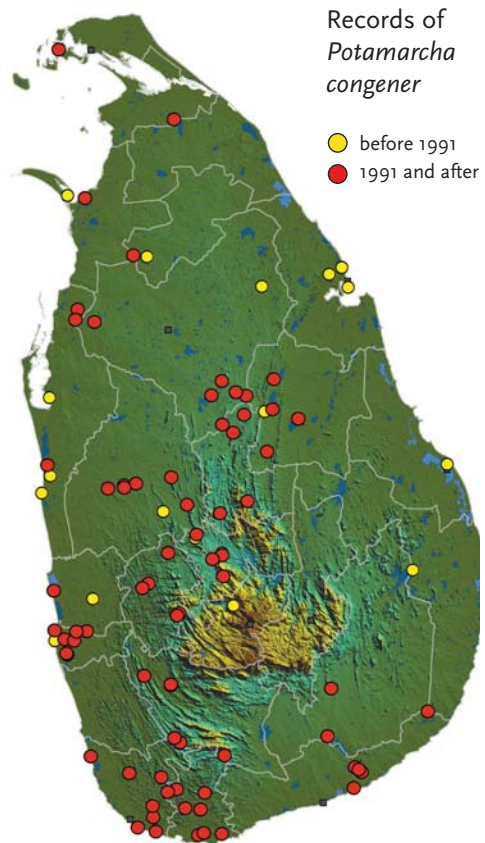
Potamarcha congener (Rambur, 1842)

Blue Pursuer

Greyish blue pruinescence on the thorax and on an otherwise black abdomen with dark yellow along the sides are characteristics of *Potamarcha congener* males. The amount and cast of bluish overlay on this medium-sized dragonfly varies according to age. The very young males resemble females with their yellowish tones and dark brown to black markings. The females are rarely pruinose and are recognized by the lateral expansions on the eighth abdominal segment.

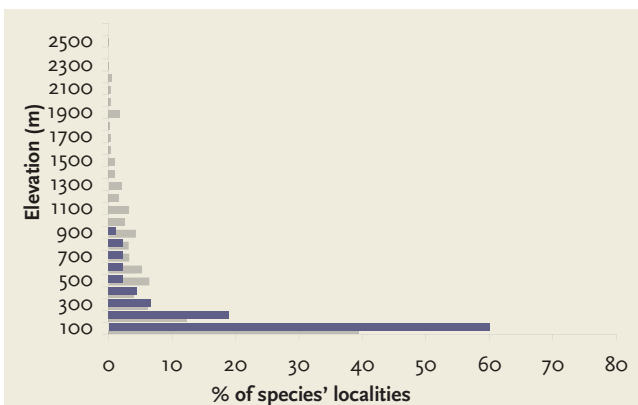
Not always close to water, males of *P. congener* will be found perched on fencing wires or shrubs, while females are only near water for mating and ovipositing and are hard to find. The species usually breeds in small weedy ponds and marshes with rich vegetation.

It is found mostly in low wetland areas around reservoirs in the wet, intermediate and dry zones of Sri Lanka all year round. The lack of new records in the east is only a consequence of less intensive fieldwork in this part of the island. Elsewhere, *P. congener* has a very wide distribution—it occurs all over eastern and southeastern Asia, as far as Australia and Papua New Guinea to the east.



Number of all localities: **90** after 1990: **72**

Number of all records: **132** after 1990: **110**





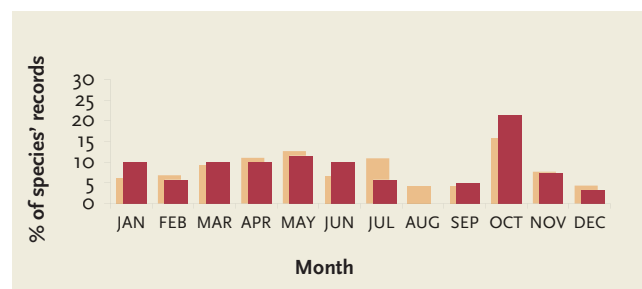
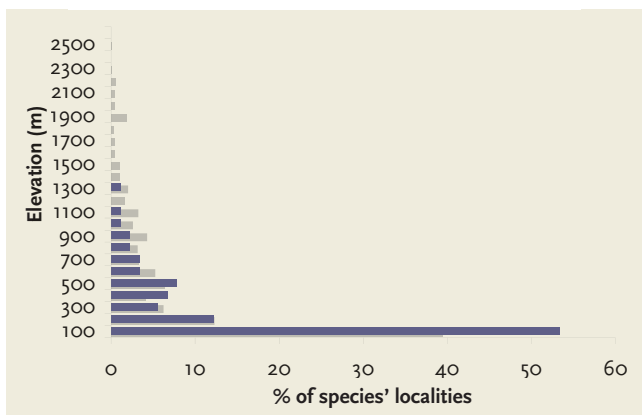
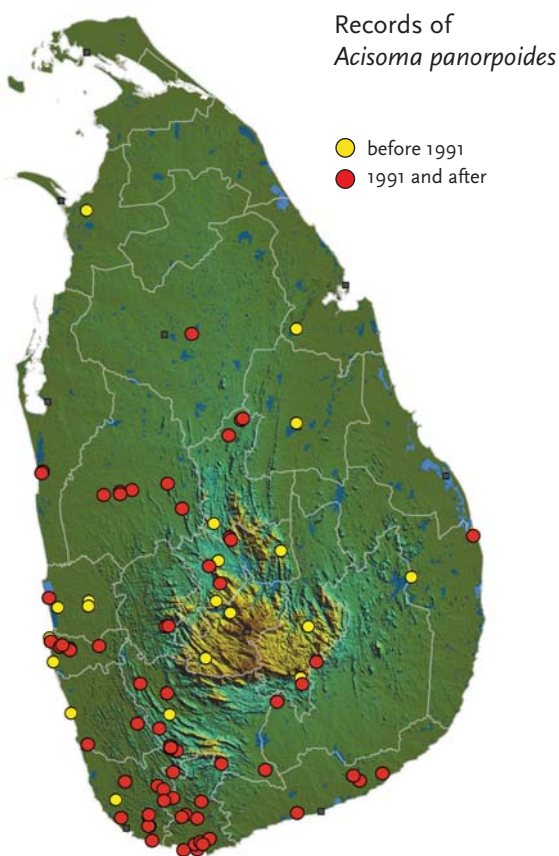
Acisoma panorpoides Rambur, 1842

Asian Pintail

Acisoma panorpoides is an adorable tiny dragonfly, with a characteristically shaped abdomen, where the anterior part is uniquely inflated and then the abdomen tapers to a point. The males are strikingly attractive with their beautiful blue eyes and sky blue colouration, which is richly adorned with a unique pattern of black spots and lines. The pale yellowish brown females cannot match their counterparts in colour, but their markings are quite similar and both sexes have white anal appendages.

In Sri Lanka, *A. panorpoides* is a wide-ranging species, found close to reeds and hidden quite low in vegetation along reservoirs, canals, weedy marshes and paddy fields, preferring fresh water. The majority of the records come from the central and southwestern part of the island, where it occurs in the lowlands up to the mid-hills. It has been found in all months, the exception being August, which is probably just a consequence of insufficient fieldwork activity.

Quite unusually for such a small and weak flyer, *A. panorpoides* has a very wide distribution. Its range extends from Afghanistan and Pakistan in the west, through south and southeast Asia to China and Japan in the east. Populations in Africa and Madagascar have long been treated as another subspecies, but probably constitute different species.



Number of all localities: **93**

after 1990: **69**

Number of all records: **148**

after 1990: **123**

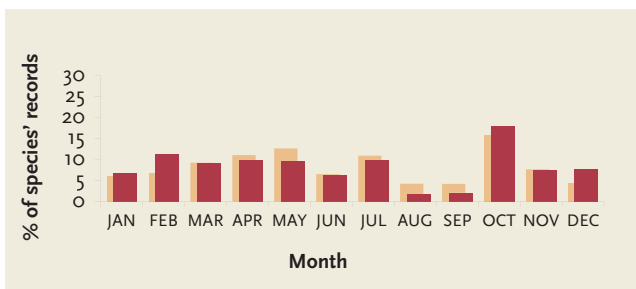
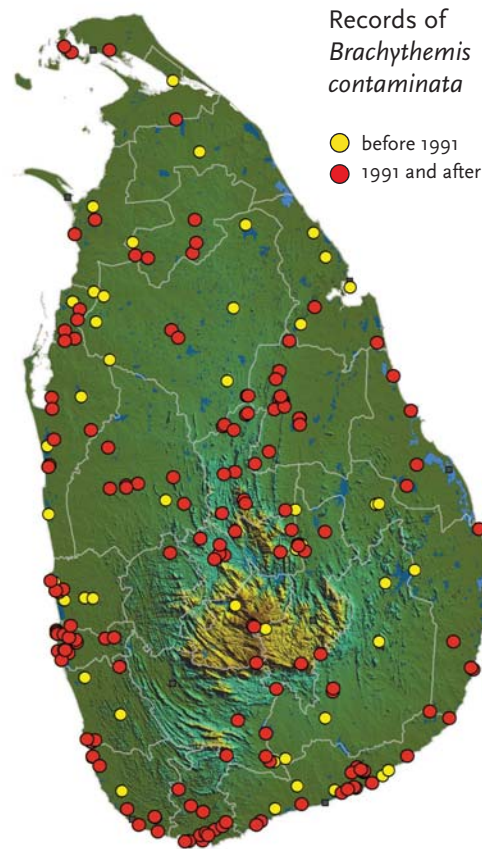
Brachythemis contaminata (Fabricius, 1798)

Orange-winged Groundling

Beautiful orange colour on the wings, extending from the body almost to the bright orange pterostigmas and weakly striped reddish orange abdomen are the trademarks of *Brachythemis contaminata*. As usual in dragonflies, these showy characters belong to mature males; the opposite sex and fresh males are plain olivaceous brown, with light stripes along the abdomen and bright ochreous pterostigmas.

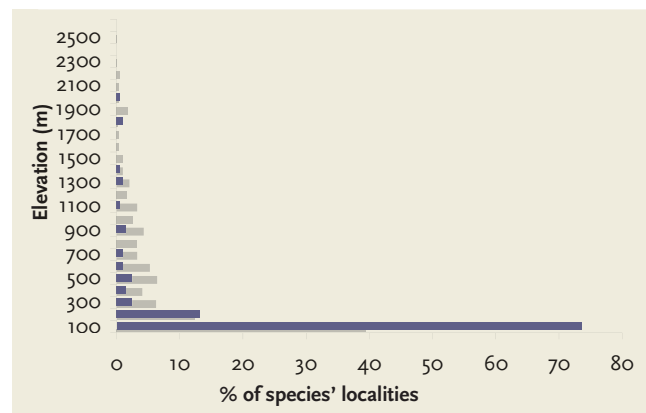
This small and ubiquitous dragonfly is not too particular about habitat and is found around canals, drains, paddy fields, sluggish streams and rivers and wells. It preys upon smaller damselflies and butterflies and the orange winged males fly vivaciously around the edges of their water habitats the whole day long till dusk.

In Sri Lanka, *B. contaminata* ranks among the top ten on the commonest species list, with over 200 recorded localities. It is found right through the year, all over the island. The majority of records originate from the plains but here and there it can surprisingly be seen in the hills and mountains, e.g. in the lakes around Nuwara Eliya. The species is found in many countries across Asia, from India and Nepal, China, Japan, Indochina, Indonesia and the Philippines.



Number of all localities: **210** after 1990: **153**

Number of all records: **300** after 1990: **231**





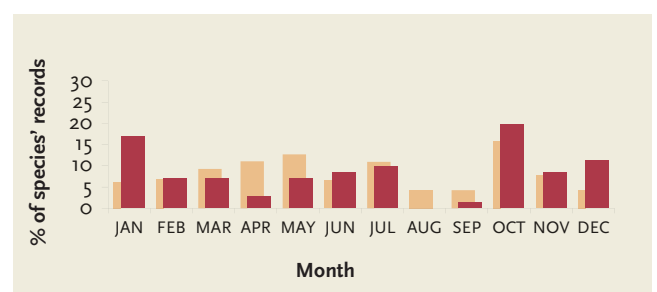
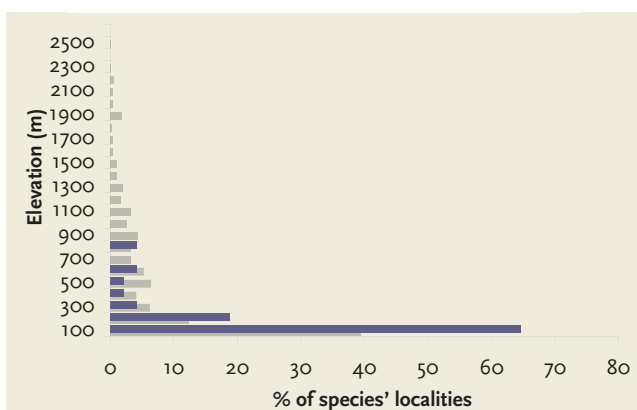
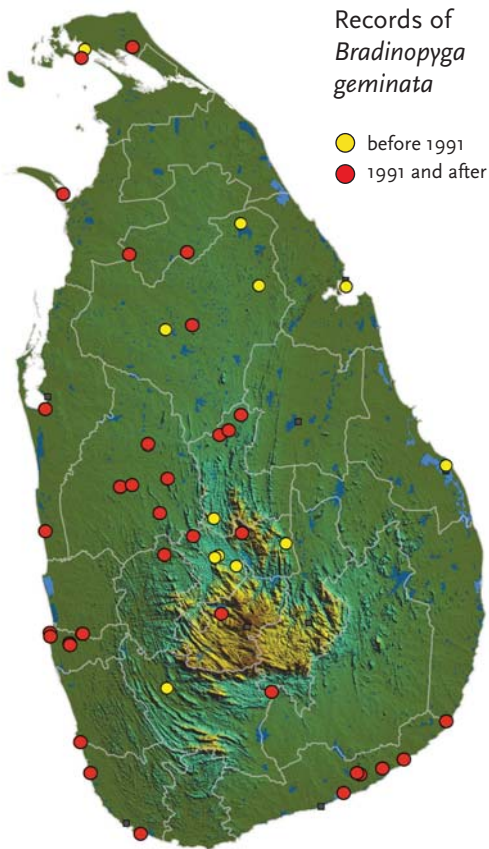
Bradinopyga geminata (Rambur, 1842)

Indian Rockdweller

When landing on granite stones or rock walls *Bradinopyga geminata* simply vanishes and is also quite appropriately called the Granite Ghost. The colouration of this cryptic species is a mixture of black, dirty brown, different shades of grey or white and some bluish pruinescence with age. Both sexes are very similar, sharing also the unique bicoloured pterostigma, which is black with white ends.

It is found mostly in the lowland areas of the wet, intermediate and dry zones of Sri Lanka, practically all year round. It is often seen in urban areas around cemented ponds and swimming pools, and it breeds in wells, small cemented tanks and rainy hollows in granite rocks. At Sigiriya, the World Heritage site, where it is very common, it is only seen when it startles and flies to another rock, vanishing into the background of the rock walls. Needless to say, its cryptic colouration is responsible for the rather low number of recorded localities and it is probably more common than the current records indicate.

It is of note that the genus *Bradinopyga* was erected and described by KIRBY (1894) based on material from Sri Lanka. *B. geminata* is a widespread species all over India and Sri Lanka and has also been recorded from Thailand.



Number of all localities: **48** after 1990: **36**

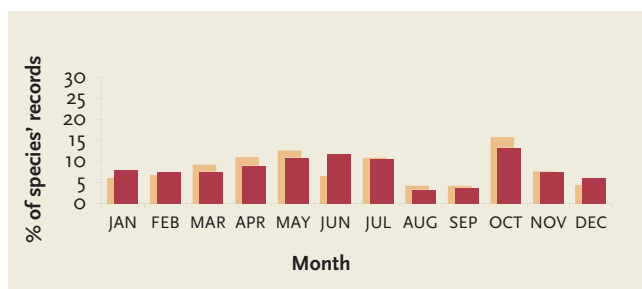
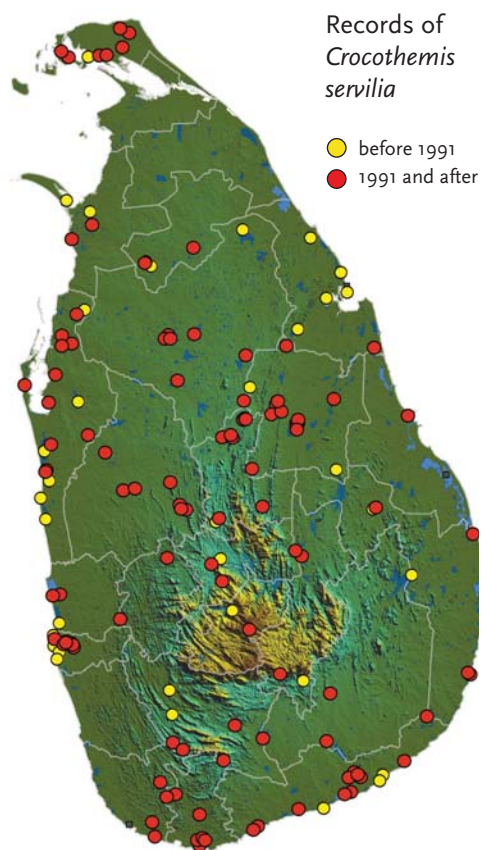
Number of all records: **77** after 1990: **63**

Crocothemis servilia servilia (Drury, 1770)

Oriental Scarlet

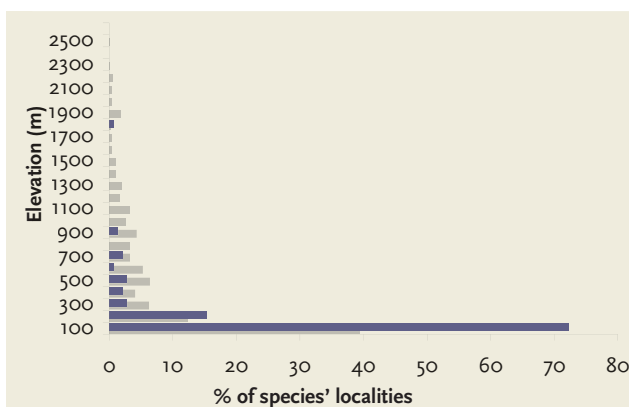
There are several bright red dragonflies around the ponds and reservoirs in Sri Lanka and they are difficult to tell apart without knowing a few tricks for determination. *Crocothemis servilia* is commonly seen sitting on sticks and branches that jut out over marshes and weedy ponds. Males are totally red from the face to the tip of the abdomen. What marks them and allows for identification are the large brownish to amber spots on the hind wings and the black mid-dorsal ridge along the abdomen. The female is mostly ochre coloured, similar to teneral males and has a prominent ovipositor. Existence of rare androchrome females has been first reported from Sri Lanka (VAN DER POORTEN, 2007).

This dragonfly is not particular about habitat and will be found in all seasons near stagnant waters in the dry, intermediate and wet zones of Sri Lanka. It is a lowland species, with only exceptional records from the hills and mountains, like the one from Victoria Park in Nuwara Eliya. The nominotypical subspecies occurs from the Middle East, across India, Nepal, China and the Malay Peninsula to Indonesia and the Philippines. Two eastern subspecies are known from Japan and Papua New Guinea.



Number of all localities: **148** after 1990: **109**

Number of all records: **231** after 1990: **174**





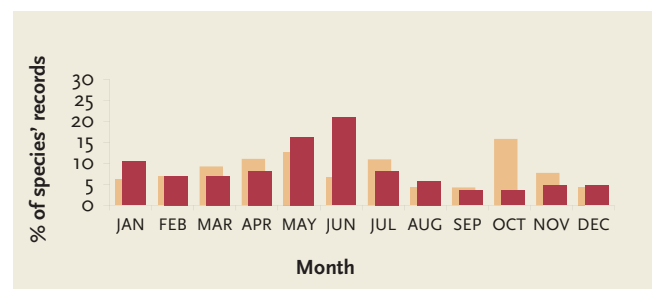
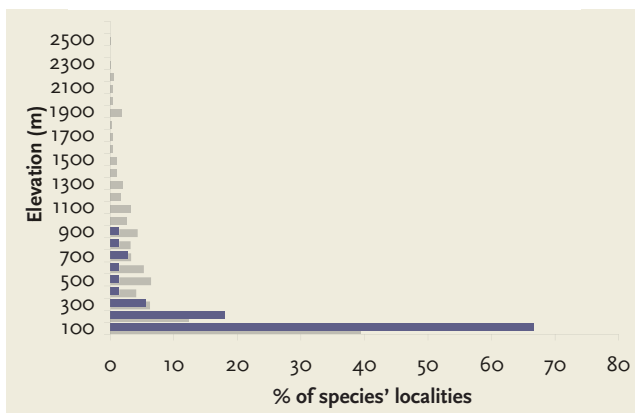
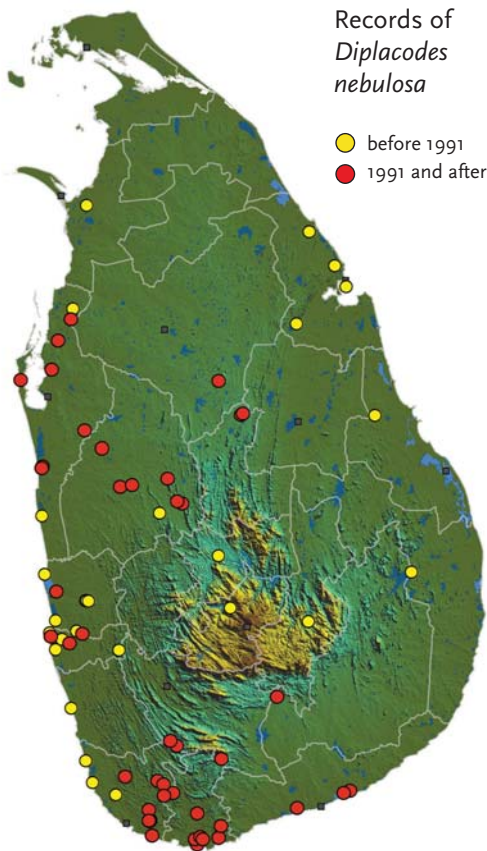
Diplacodes nebulosa (Fabricius, 1793)

Black-tipped Percher

The brownish black clouded tips on the wings, small black body with cream coloured anal appendages and rusty red eyes make the adult males of *Diplacodes nebulosa* easy to recognize. Subadult males are similar and have paired yellowish spots along the abdomen. The yellowish females are more difficult, without any obvious distinguishing colours or dark tipped apices of the wings. But the rather broad black mid-dorsal stripe on the thorax, confluent with a narrower black stripe on the humeral suture and black stripes along the dorsum and sides of abdomen might be helpful in determination.

This small dragonfly will be found perched on grasses or sticks in still water marshes, ponds and reservoirs. May and June seem to be the peak of its flight season which lasts throughout the year. It is far less common than its next congener, but still it is not rare in wet lowland areas in the dry, intermediate and wet zones of the island. The lack of recent records in the north and east is most probably the consequence of less intensive fieldwork in these parts of the island.

The range of *D. nebulosa* comprises southeastern and eastern Asia, from Sri Lanka and India, through Nepal, China and Hong Kong and southwards to the Malay Peninsula, Indonesia, Papua New Guinea and as far as Australia in the southeast.



Number of all localities: **72**

after 1990: **44**

Number of all records: **104**

after 1990: **66**

Diplacodes trivialis (Rambur, 1842)

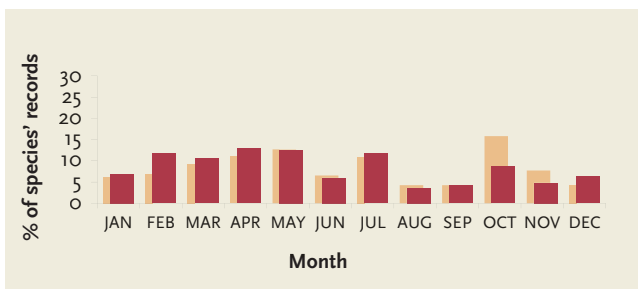
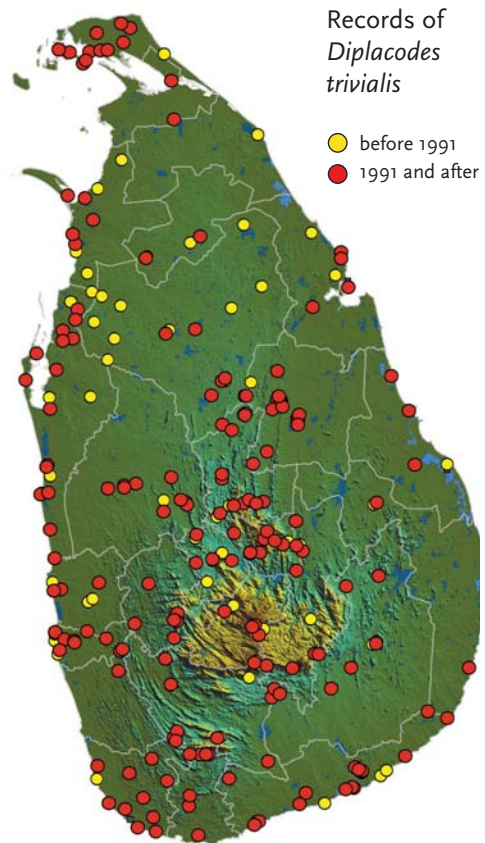
Blue Percher

The prestigious bronze medal winner among the most common Sri Lankan dragonfly species, with over 250 recorded localities, is *Diplacodes trivialis*. And this despite a slightly unfair fact that it is easily overlooked because of its small size and habit of hovering just above the ground, landing on small stones and leaf litter.

Young males are cryptically coloured greenish yellow similar to females but become pruinose to a light greyish blue over most of the body as they mature. The hind wings have a very small amber spot at the base, the face is light coloured, the eyes appear mostly blue in males and greenish brown in the opposite sex and both have yellowish white anal appendages.

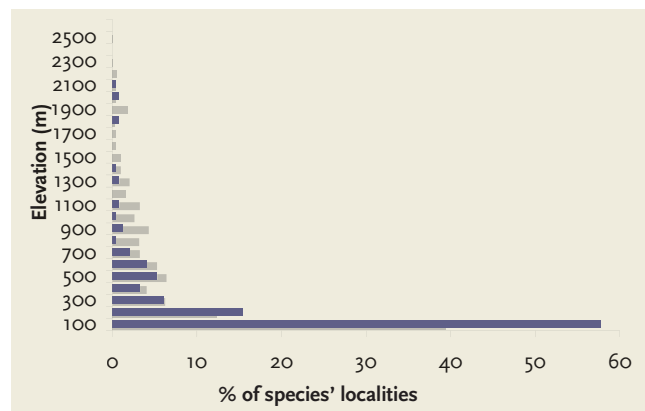
The species is on the wing in all seasons. Commonly, it dwells quite far from the water resting on paths and bare ground, but usually it is seen near ponds, muddy reservoirs, lagoons and ditches and it likes the island's sandy beaches below coconut palms as well. It is widely distributed across Sri Lanka, in the wet, intermediate and dry zones and from low to mid elevations. It is also occasionally met with in the mountains.

D. trivialis has very wide distribution across South-east Asia, with the eastern limits of its range in Japan, southeastern in Australia, Papua New Guinea and Fiji, while in the southwest it reaches the Seychelles.



Number of all localities: **254** after 1990: **180**

Number of all records: **358** after 1990: **254**





Indothemis carnatica (Fabricius, 1798)

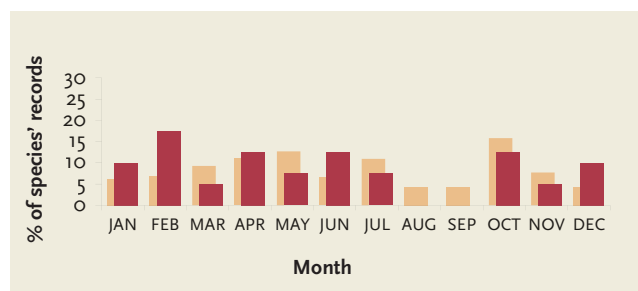
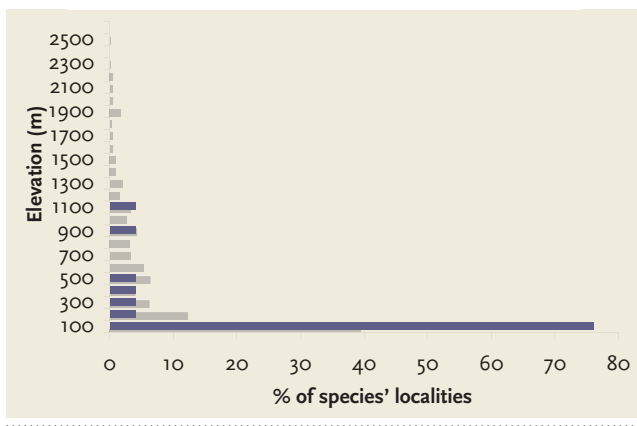
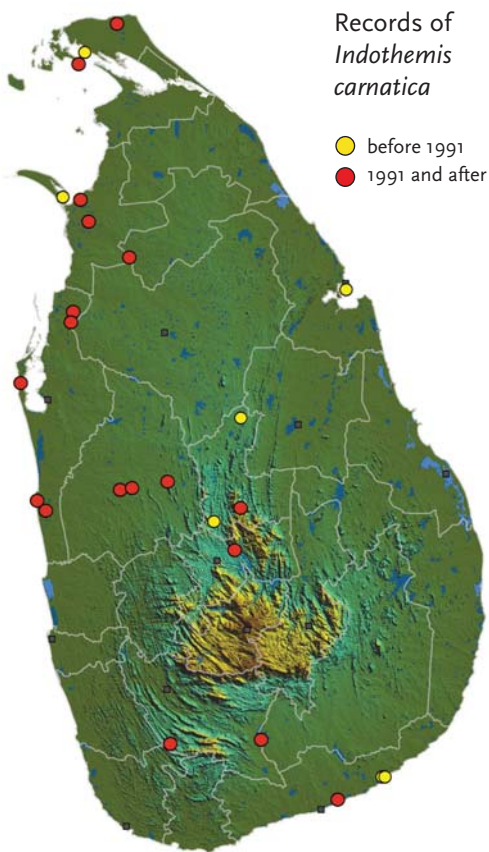
Light-tipped Demon

The creamy-yellow anal appendages on this otherwise gently pruinosed dark brownish black dragonfly are clearly visible even when *Indothemis carnatica* sits, as it typically does, in the middle of a small pond or marsh.

Its eyes are grey-blue topped with reddish, the frons is metallic violet-black, the wings are clear without any basal markings, and the pterostigma is dark amber, framed in black. Juvenile males are a purplish colour with yellow markings along the side of the abdomen. The female is predominantly greenish yellow with variable black markings; the ochreous prothorax has a reddish spot on the middle and sides.

I. carnatica is a scarce and poorly known species. In Sri Lanka it mostly inhabits the dry zone lowlands and can be seen on the wing from October until July. It prefers weedy marshes, canal edges and small reservoirs. Females are rarely seen at water but can be common during the right season.

Apart from Sri Lanka, *I. carnatica* is known from the Western Ghats and West Bengal in India, from Thailand and recently also from Cambodia and Malaysia.



| | |
|------------------------------|----------------|
| Number of all localities: 25 | after 1990: 18 |
| Number of all records: 40 | after 1990: 33 |

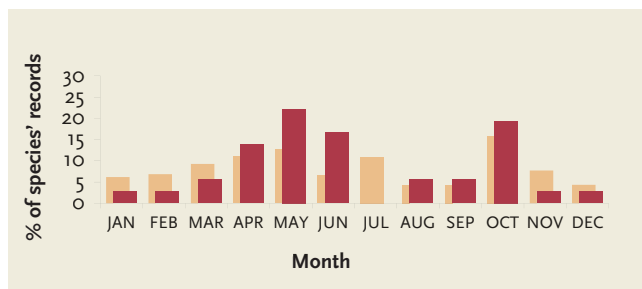
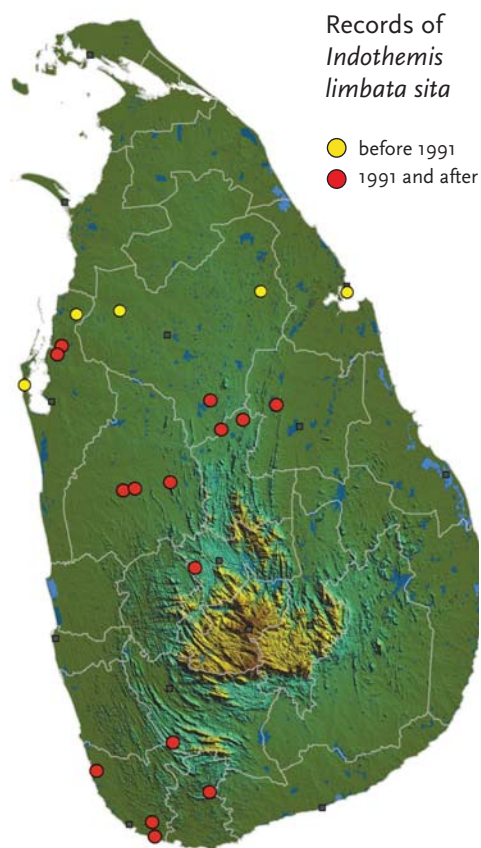
Indothemis limbata sita Campion, 1923

Restless Demon

Found mostly in dry zone wetlands and swampy areas next to small reservoir drains, *Indothemis limbata sita* prefers to sit on sticks and grasses in the middle, away from the water edges. The dark head and thorax, dark brown wing patches and deep blue-black abdomen, marked sparingly with paired yellow spots on the dorsum of the terminal segments help to identify this fast flying species. Females have black and bright yellow markings on the thorax and abdomen, and amber coloured marks on the hind wings; they are more difficult to spot as they tend to stay in deep brush next to the marshes and small reservoirs.

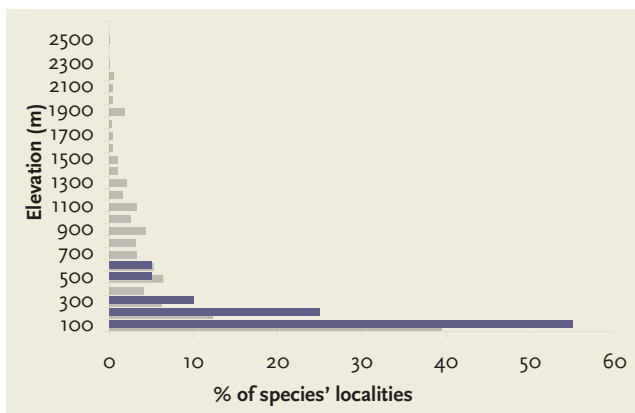
I. limbata sita was originally described by H. Campion from Sri Lanka. For decades, it was only known from the type locality Trincomalee (CAMPION, 1923). In the 1970's the Smithsonian Institution researchers found it in Wilpattu National Park and DE FONSEKA (1990, 2000) reported on an old Colombo Museum record from Horowopathana. Only in the past few years have more records been gathered from the northern, central and southwestern parts of the island, but it remains as poorly known as its preceding congener.

The nominotypical subspecies, which has the apices of the wings bordered with blackish brown, occurs in Myanmar, Thailand, Peninsular Malaysia and Singapore. The subspecies *I. limbata sita* is known only from scattered localities in India and from Sri Lanka.



Number of all localities: **20** after 1990: **15**

Number of all records: **39** after 1990: **31**





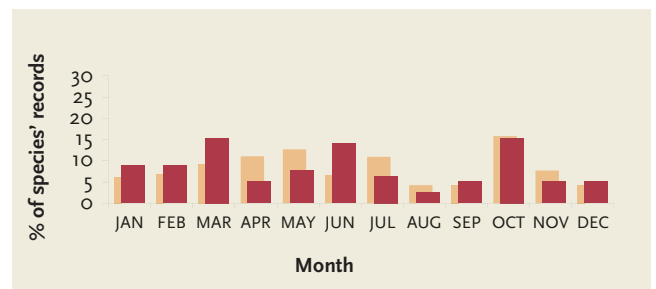
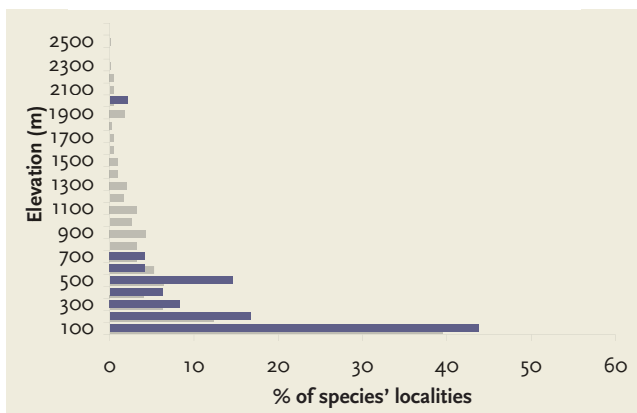
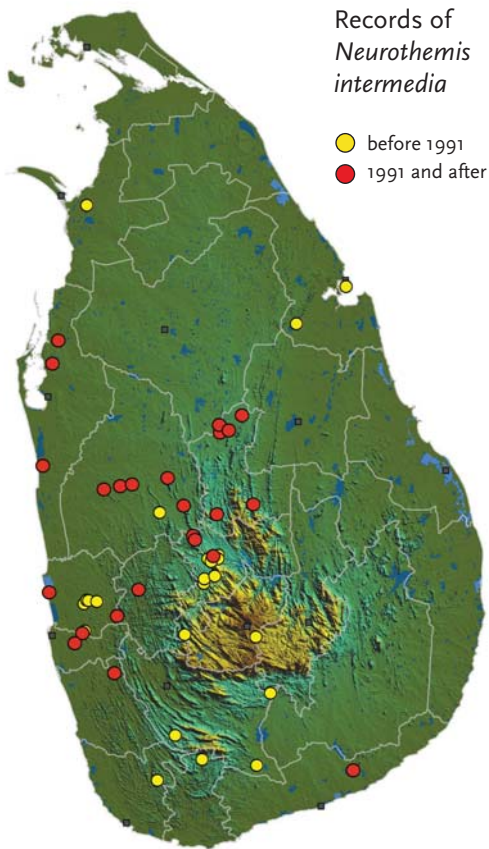
Neurothemis intermedia *intermedia* (Rambur, 1842)

Paddyfield Parasol

The broad orange colouration across the basal portions of the wings, red-topped eyes and orange body are the main features that make the male of *Neurothemis intermedia* stand out. The female, with no markings on the wings and dull coloured body is less obvious and harder to distinguish from other species, though the wing venation and lateral black stripes on the abdomen are characteristic of the species.

The so named Paddyfield Parasol is usually found around the edges of paddy fields or in shaded brush next to coconut or fruit plantations. It is a strong flyer but usually flutters among the grass. Upon disturbance, it disappears quickly into the dense brush or into the middle of the paddy field. It is on the wing throughout the year, occurring in the lowlands and mid-hills, but it is by far not common. Proportionally, the number of recent records is below expectations and records from the northern, eastern and southern parts of the island are almost completely lacking.

Several subspecies of *N. intermedia* have been described, but the taxonomic status of some is doubtful. The range of the nominotypical subspecies in the Indian subcontinent comprises Bangladesh, India, Sri Lanka and Nepal.



Number of all localities: **48**

after 1990: **24**

Number of all records: **81**

after 1990: **51**

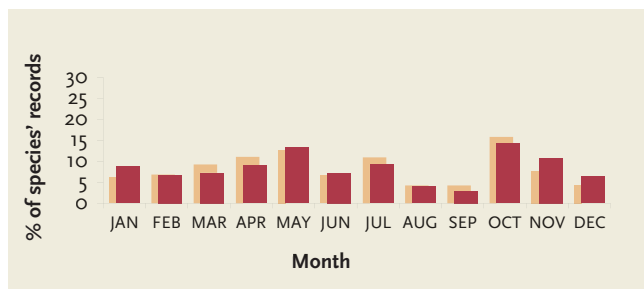
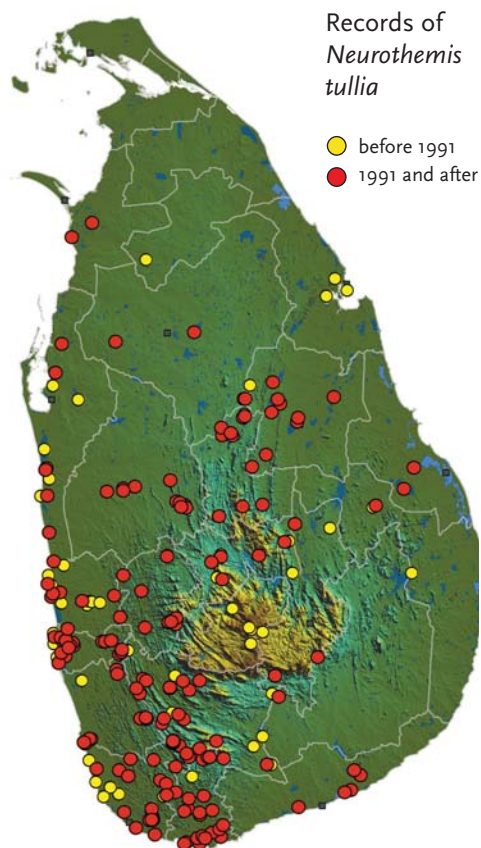
Neurothemis tullia tullia (Drury, 1773)

Pied Parasol

Due to the beautiful wing markings and fluttery flight, *Neurothemis tullia* is often mistaken for a small butterfly by many observers when seen around marshes and paddy fields.

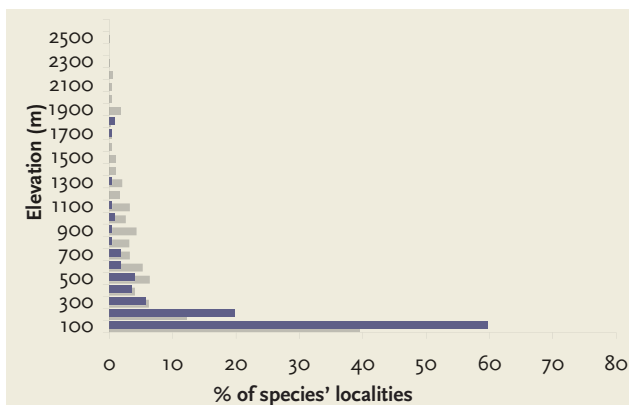
The colouration of its wings is unique. In males, the wings are brownish black from the body to the nodus, followed with a thin white band and then clear to the tip. In females, this colouration is even more attractive, with brown tips to the pterostigma, then clear with whitish veins, followed by a tapering brown band at the nodus and the rest finely golden enfumed. The abdomen of the juvenile male is like the female's, having a wide cream coloured stripe dorsally with a dark brown stripe laterally and cream coloured anal appendages. In adult males the abdomen is black with more or less obscured cream coloured markings dorsally and white anal appendages.

N. tullia is a very common dragonfly in a wide variety of wetlands in the lowland areas, but very scarce at higher elevations as well as in the northern and southeastern parts of the island. The species tends to emerge in large numbers several times during the year and can be seen in all seasons. The nominotypical subspecies is widespread and common throughout mainland tropical and subtropical Asia, while another subspecies occurs in Indonesia.



Number of all localities: **234** after 1990: **173**

Number of all records: **373** after 1990: **280**



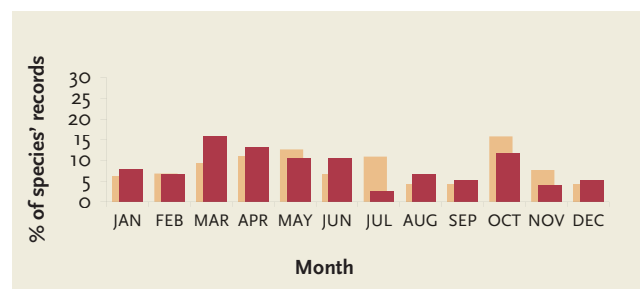
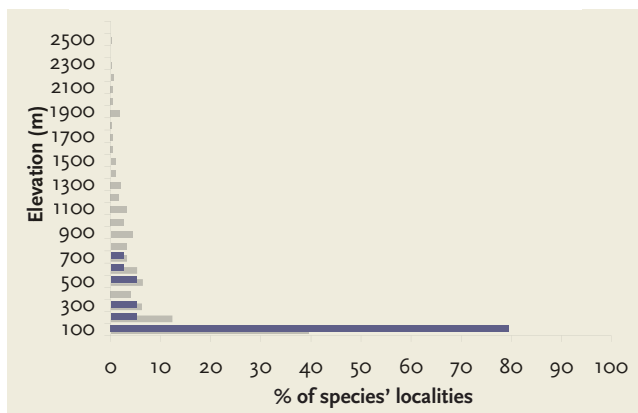
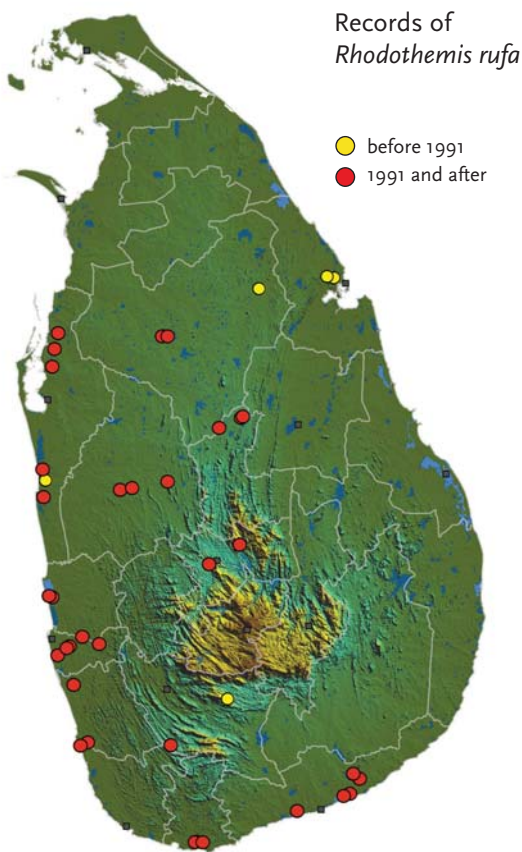


Rhodothemis rufa (Rambur, 1842)

Spine-legged Redbolt

The next and by far not the last of the quite similar bright red swamp and reservoir dwelling species is *Rhodothemis rufa*. As the common name indicates its legs are armoured with several long spines but what will additionally allow its separation from the other red species is the pin point meeting of the eyes, the narrow streak of amber-yellow colouration at the base of the wing and the bright red stripe on the dorsum of the thorax, running from behind the head, between the wings and reaching the abdomen. In females and juvenile males, the body is ochre or reddish coloured with a very distinctive whitish dorsal thoracic stripe that extends to the first abdominal segments.

In Sri Lanka, *R. rufa* is found predominantly in the lowlands of the wet, intermediate and dry zones, next to well-vegetated reservoirs, ponds and swamps. Though surely under-recorded, it is shown as not very common and there are almost no records from the north and east of the island. The species is very widespread and common over much of its range, which extends over India to Hong Kong, the Philippines, Indonesia and Papua New Guinea.



| | |
|------------------------------|----------------|
| Number of all localities: 39 | after 1990: 34 |
| Number of all records: 80 | after 1990: 74 |

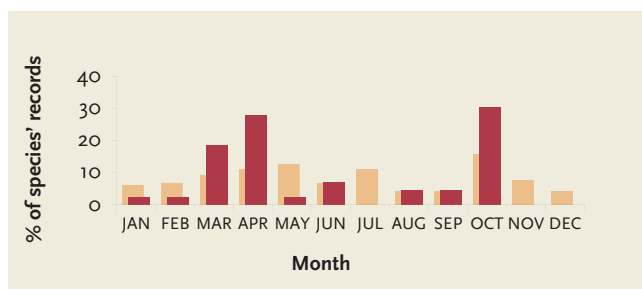
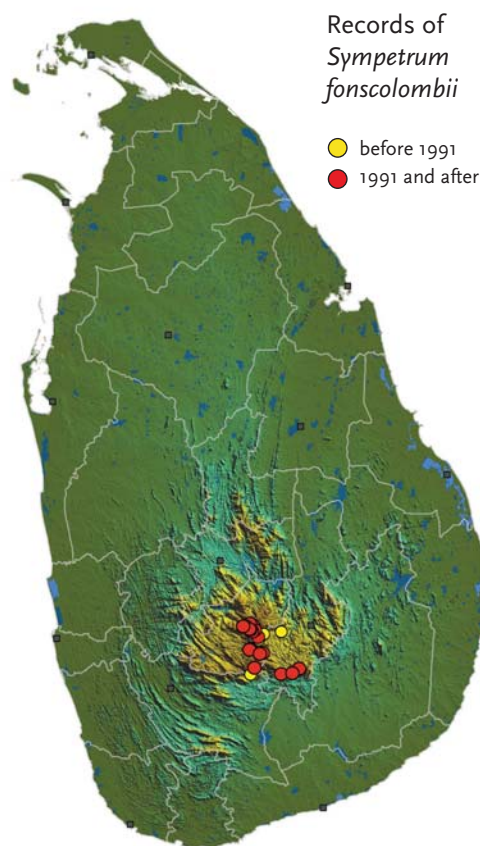
Sympetrum fonscolombii (Selys, 1840)

Red-veined Darter

Sympetrum fonscolombii is the only representative of its genus in Sri Lanka, confined to marshes, swamps and lakes in the mountains in the central part of the island. In the group of red coloured species, the male stands out due to its slender cylindrical abdomen, wings with bright red venation, pale pterostigma and yellow patch on the base of the hind wings, rusty red-topped eyes which are blue below, and vividly red face, coloured light yellowish on the sides. The female has the red colour replaced by light ochreous, its wing venation is yellowish, face uniformly creamy white and the eyes are brownish above and bluish below.

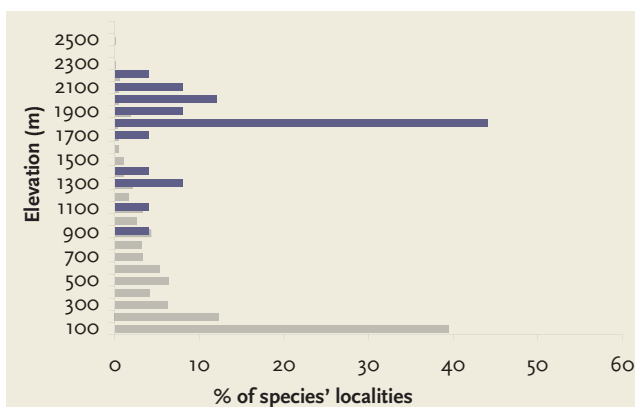
Elsewhere the species has a reputation of being a strong migrant, but in Sri Lanka it seems quite closely confined to its mountain habitats. The majority of records come from the vicinity of Nuwara Eliya and Horton Plains and a cluster of lower altitude localities around Haputale. The best months to observe the species seem to be from March to June and from August to October. In the National Red List the species has been ranked as Endangered by VAN DER POORTEN & CONNIF (2012).

The range of *S. fonscolombii* extends from northern Europe, the Mediterranean, all over Africa, Madagascar, Middle East and Central Asia to India, Sri Lanka, Nepal and China, as well as Japan.



Number of all localities: **30** after 1990: **20**

Number of all records: **44** after 1990: **31**



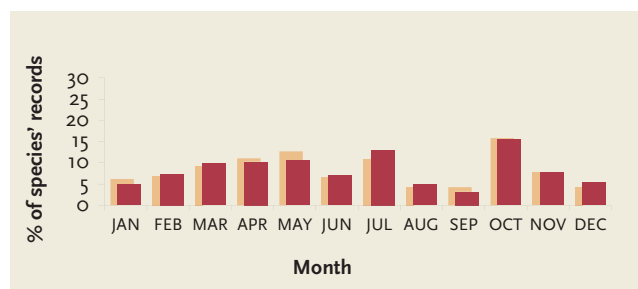
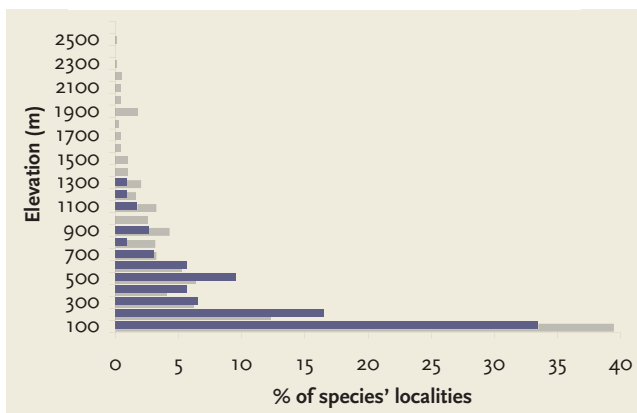
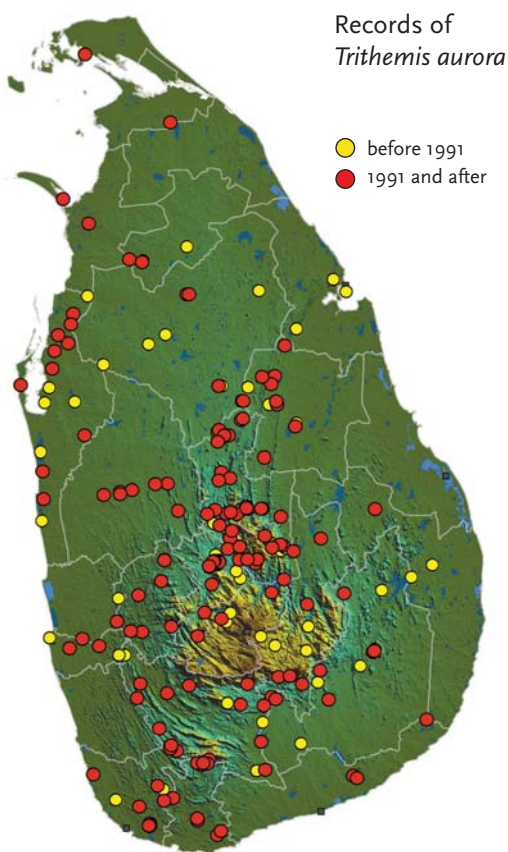


Trithemis aurora (Burmeister, 1839)

Dawn Dropwing

A very photogenic species with a striking fuchsia coloured body makes *Trithemis aurora* stand out as it perches on ferns, sticks and grasses next to ponds, reservoirs, slow moving streams and irrigation canals. It is a thin layer of pink pruinescence that gives the males of this Dropwing such a characteristic colouration, which is further spiced with pinkish eyes, violet metallic frons and beautiful orange-red veins with amber basal markings on the wings. The juveniles are orange-red and the females are ochreous with large golden-brown coloured patches at the base of the wings.

T. aurora is widely distributed all around the island. It occurs from the lowlands to the mid-hills and is seen in flight throughout the year. It is also common and widespread elsewhere in Southeast Asia and East Asia. It is found in India, Nepal, China and all over the Malay Peninsula, and as far as Japan, Hong Kong, Taiwan and Indonesia in the east.



Number of all localities: **209**

after 1990: **147**

Number of all records: **303**

after 1990: **221**

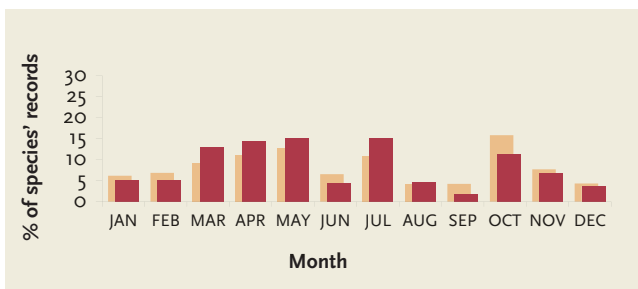
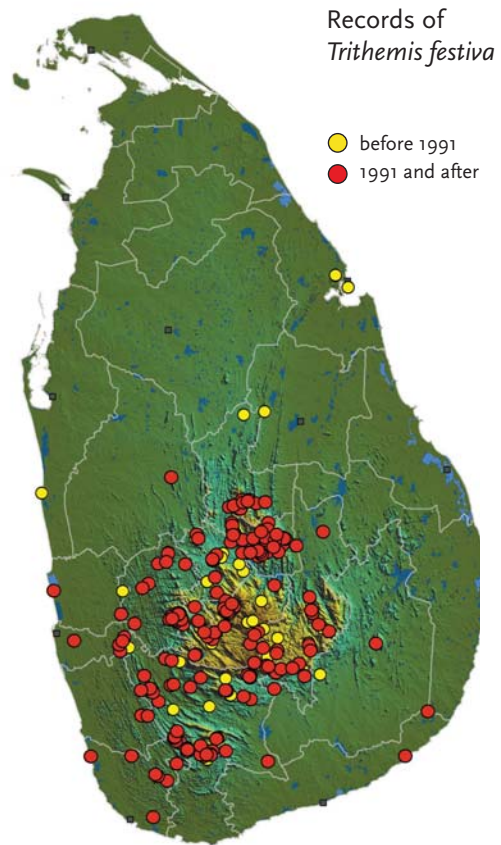
Trithemis festiva (Rambur, 1842)

Indigo Dropwing

Often found resting on rocks in streams and rivulets, the lovely indigo coloured males of *Trithemis festiva* are easy to identify. Mature males bear a characteristic dark blue pruinescence on the thorax and the first few abdominal segments, with small paired elongated orange coloured marks along the mid-dorsum of a slender black abdomen. Both sexes have a dark brown mark at the base of the hind wings. The females are very different. Their wings are sometimes enfumed with dark apices and the abdomen is yellowish with broad black markings. Females are rarely seen except when they appear to quickly mate and oviposit before vanishing.

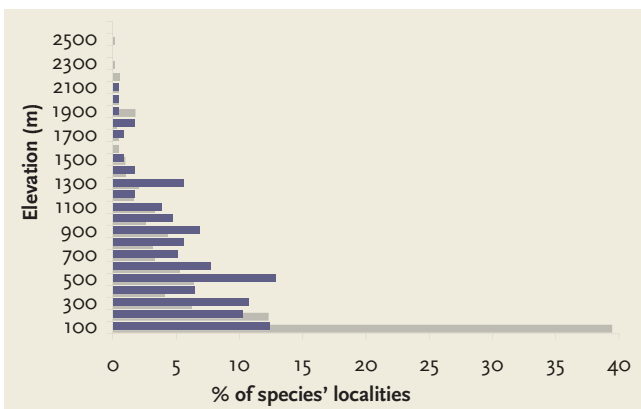
T. festiva is very common in the southwestern and central parts of Sri Lanka, occurring from the lowlands up to the hills and mountains. It prefers running streams with large stones along with its faithful and even more common companion *Euphaea splendens*. Widely isolated old records from the vicinity of Trincomalee (KIRBY, 1894) are questionable and may belong to *Indothemis limbata sita*, which was described from some of the specimens reported by Kirby as *T. festiva* (CAMPION, 1923).

The species has an extremely wide distribution, from the Mediterranean coasts of Turkey, and all over tropical and subtropical Asia to Papua New Guinea.



Number of all localities: **238** after 1990: **187**

Number of all records: **306** after 1990: **237**





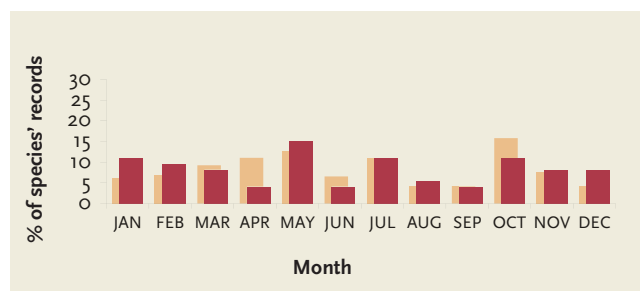
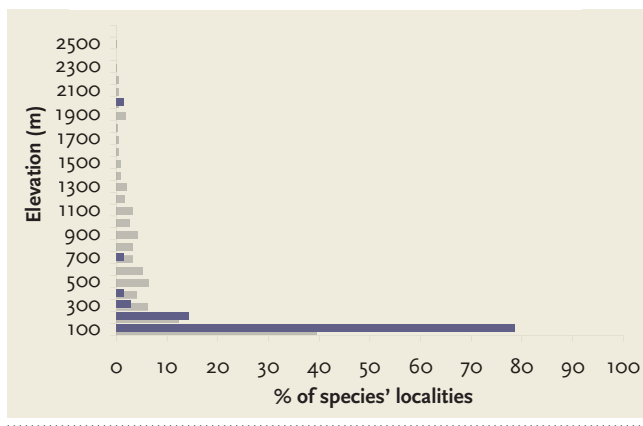
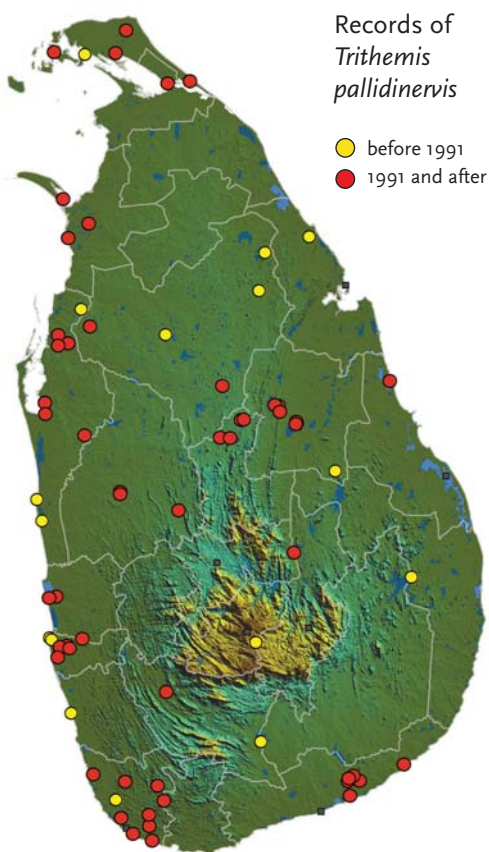
Trithemis pallidinervis (Kirby, 1889)

Dancing Dropwing

Often seen with its body in an “obelisk” position, and perched on long spidery legs with the upright abdomen raised to deflect the sun, *Trithemis pallidinervis* is the least common Dropwing species in Sri Lanka.

It is a medium-sized slender dragonfly and the largest of its congeners; males and females are fairly similar in colouration and markings. One of the species’ peculiarities is its bicoloured pterostigma, which is black with creamy white ends. Wing venation is reddish with an orange spot at the base of the hind wing that is slightly larger than in the forewing. The abdomen is lined with yellow and black markings and it has two paired stripes on the thorax.

Males perch on reeds or grasses in slow streams or marshes and females are found in the surrounding vegetation. *T. pallidinervis* can be met on the wing in all seasons and occurs sparsely in the lowlands all over the island, though in certain regions there are no recent records. The distribution of the species stretches from Iran and Oman in the west, through India and Nepal to the Malay Peninsula, China, Taiwan, the Philippines and Indonesia.



Number of all localities: **72**

after 1990: **54**

Number of all records: **91**

after 1990: **70**

Onychothemis testacea ceylanica Ris, 1912

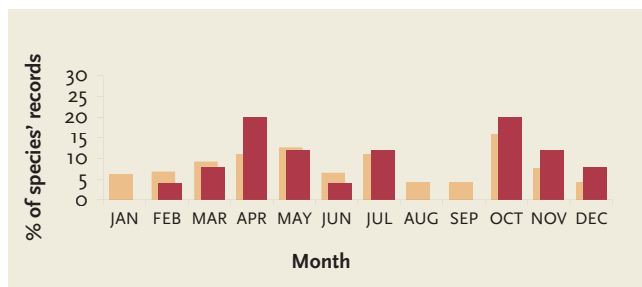
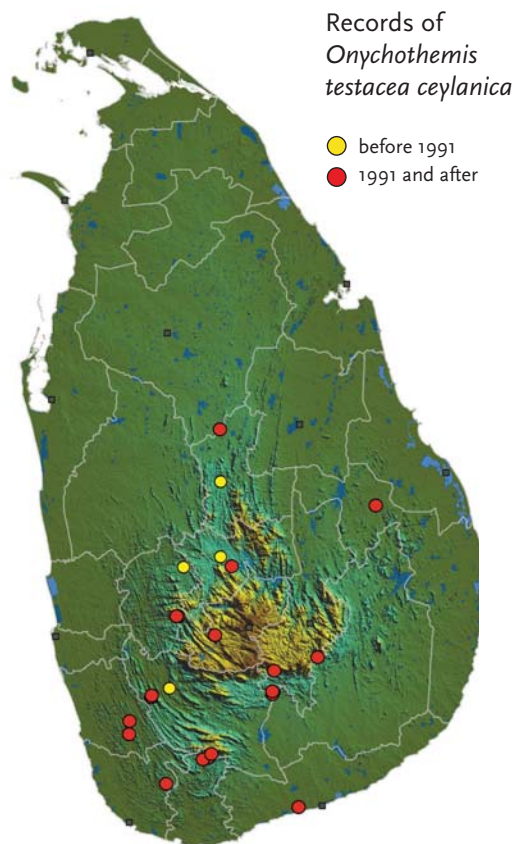
Aggressive Riverhawk

Beautiful green eyes, dark metallic green thorax with citron-yellow streaks and black abdomen, richly marked with the same citron-yellow and reddish-ochreous are trademarks of *Onychothemis testacea ceylanica*. This robust species is a strong flier and is not easy to spot. Both sexes are generally similar in appearance, but the females have a stouter abdomen and are only rarely seen.

The published records for *O. testacea ceylanica* are very scarce. Its type locality from the original description is Nalande (Ris, 1912a), while FRASER (1936) lists it from Kandy and CHANDANA et al. (2012) from Ambalanthota. Other records, mainly collected in recent years, are scattered around the southwestern part of the island, with two dry zone outliers from Dambulla Oya further north and Maha Oya in the east.

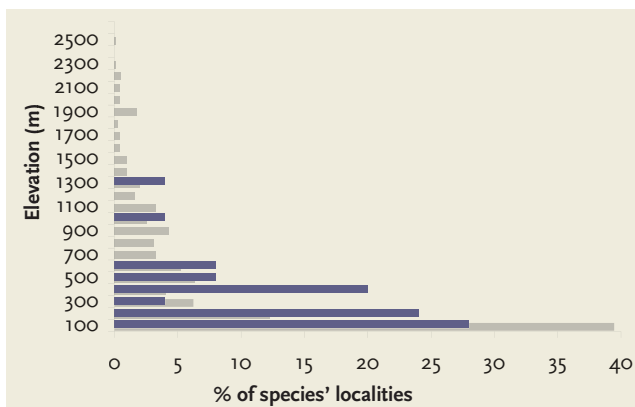
The species inhabits moderately slow running, partly shaded streams and rivulets with rich surrounding vegetation from the lowlands to the mid-hills. This type of habitat is under threat and at the national level the species has been ranked as Endangered by VAN DER POORTEN & CONNIFF (2012).

Apart from Sri Lanka, *O. testacea ceylanica* is known from the Western Ghats and eastern India. As these populations are known to differ at least in colouration, a taxonomic study on material from different regions, also including the other two subspecies, would be very welcome.



Number of all localities: **25** after 1990: **20**

Number of all records: **26** after 1990: **21**





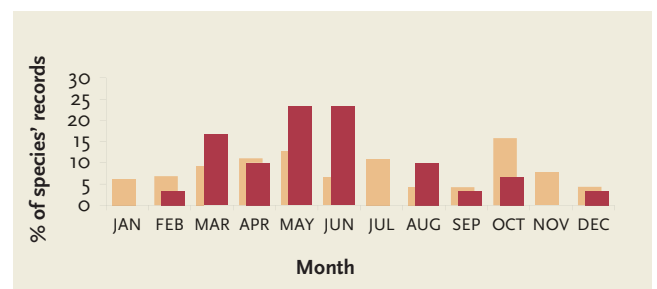
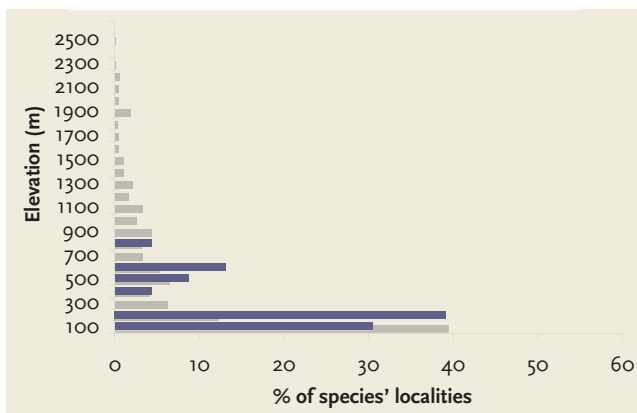
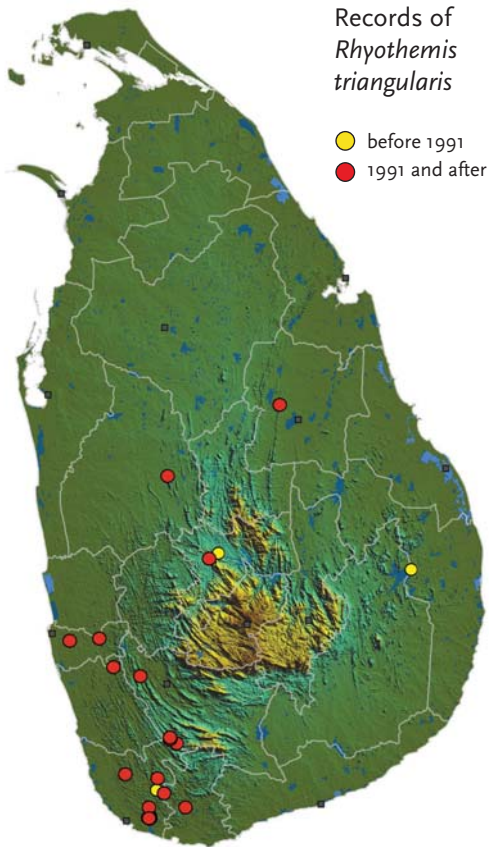
Rhyothemis triangularis Kirby, 1889

Sapphire Flutterer

Stunning in full sunlight, *Rhyothemis triangularis* is simply beautiful with its metallic blue face, sapphire metallic glittering wing spots and bluish black body. Generally quite rare in dragonflies, both sexes are coloured similarly and the attractiveness of the male is shared by the female to the same extent.

It is found in marshes, sluggish ditches or drains but it is not common in these areas. A close search is needed to find this lovely flutterer among other more plentiful species in such habitats. The majority of the not very numerous observations come from the lowlands of Sri Lanka's wet zone, though individual records are also known from drier parts of the island. Based on the hereto scarce collection of records, it seems that the best season for finding *R. triangularis* on the wing is between February and May.

The range of this small delightful species is surprisingly wide—it occurs from the Western Ghats and the rest of India, and Nepal, to the Malay Peninsula, Indonesia, the Philippines, Taiwan and Hong Kong.



Number of all localities: **24** after 1990: **21**

Number of all records: **36** after 1990: **32**

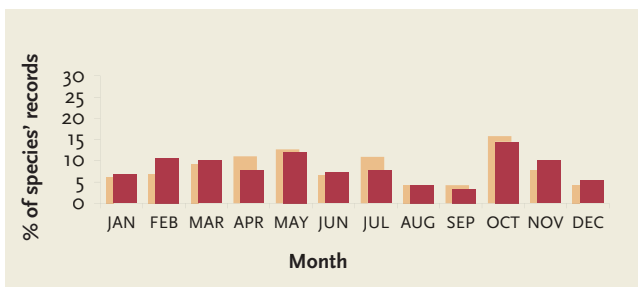
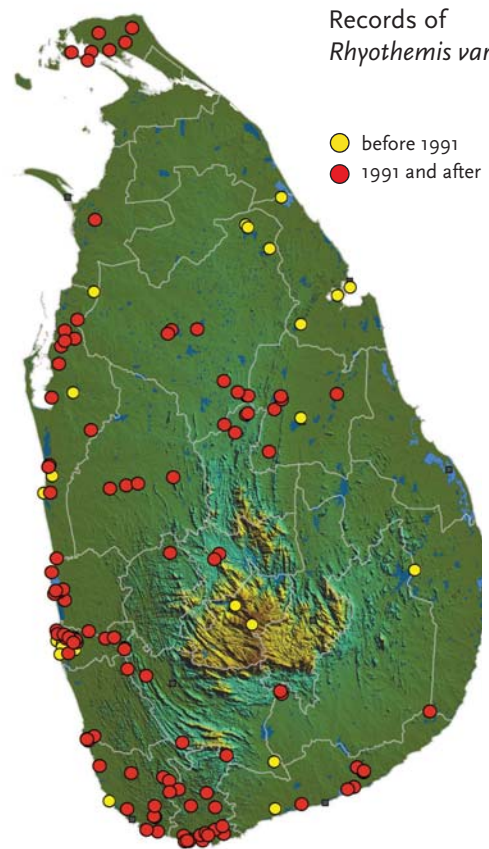
Rhyothemis variegata variegata (Linnaeus, 1763)

Variegated Flutterer

Commonly mistaken for a butterfly because of its fluttery flight and unique wing colouration, *Rhyothemis variegata* cannot be mistaken for any other among Sri Lankan dragonflies. They are often seen in colourful groups, fluttering in circles above vegetation near reservoirs, swamps and small ponds and skilfully balancing with spread wings on the very tips of undulating grasses. Although perceived as a slow moving flyer from a distance, it is quite shy and surprisingly agile when disturbed.

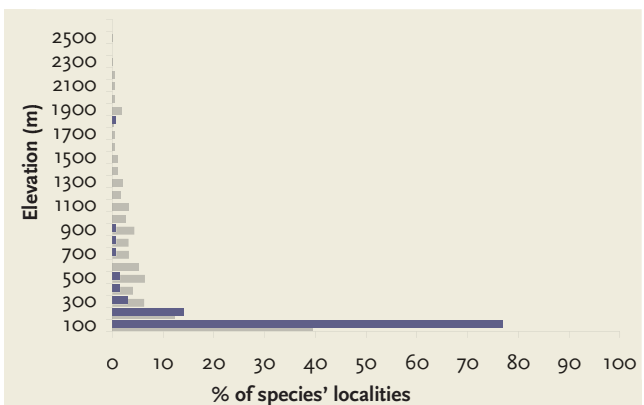
Males and females are similar in having a dark metallic green face and thorax and a black-green abdomen, but they differ widely in the wing markings. In the male, the wings are softly tinted yellow and have dark spots at the wing tips, while the female has clear wing tips. Other markings are also peculiar to each sex, the beautiful dark brownish black and yellow pattern on the base of the hind wing being much more extensive in females, reaching as far as the pterostigma.

R. variegata flies all year round and can be usually seen next to slow streams, reservoirs, paddy fields and weedy swamps. It is a very common dragonfly in the lowlands of Sri Lanka, but with only a few recent records from the east of the island. The distribution of the nominotypical subspecies comprises Sri Lanka, India, Nepal, parts of China, Myanmar, Thailand and Vietnam.



Number of all localities: **139** after 1990: **110**

Number of all records: **231** after 1990: **180**





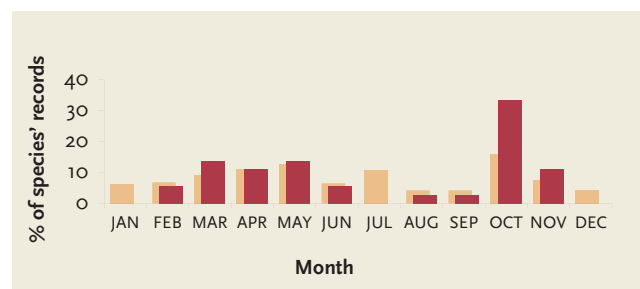
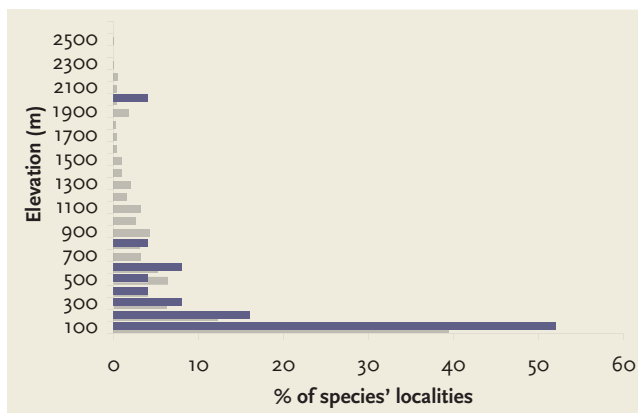
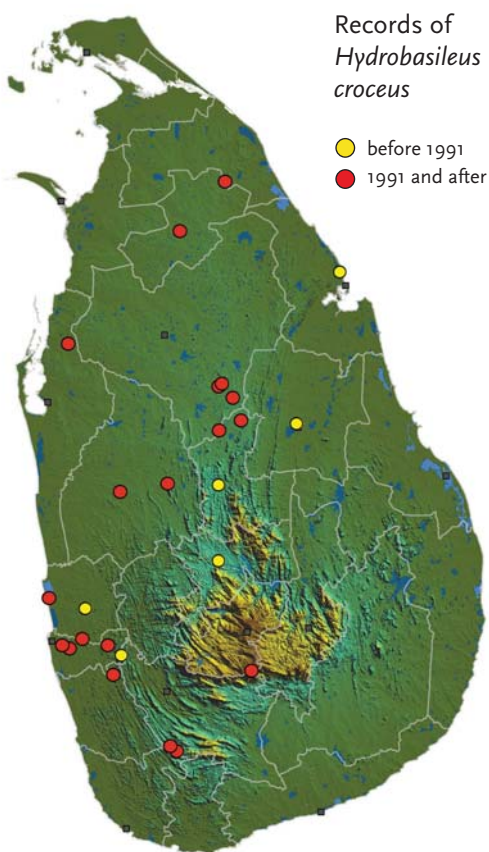
Hydrobasileus croceus (Brauer, 1867)

Amber-winged Glider

A distinctive dark bronzed spot at the posterior border of the base of the hind wing is the characteristic mark of *Hydrobasileus croceus*, and seen clearly in its gently amber tinted wings when it glides over weedy tanks or soars above the trees. It is a large and robust dragonfly, an elegant glider with very broad hind wings. The abdomen is ochreous with black and narrow yellowish markings along the abdomen. Both sexes are quite similar in appearance.

They are not usually sighted face to face because they are high flyers. They tend to land on treetops and come to the water only for mating. Preferring weedy tanks, the females deposit eggs on the surface of floating weeds. *H. croceus* is not common in Sri Lanka but also maybe overlooked. It appears to be seasonal, with the majority of observations originating in March to May and October to November.

The species is found throughout Southeast Asia, from Sri Lanka and India, across China and the Malay Peninsula to Indonesia, the Philippines and Japan in the east.



Number of all localities: **25** after 1990: **19**

Number of all records: **39** after 1990: **33**

Pantala flavescens (Fabricius, 1898)

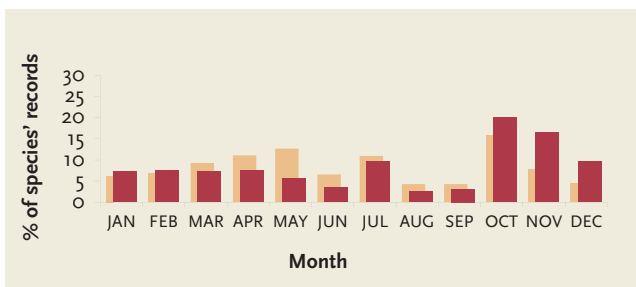
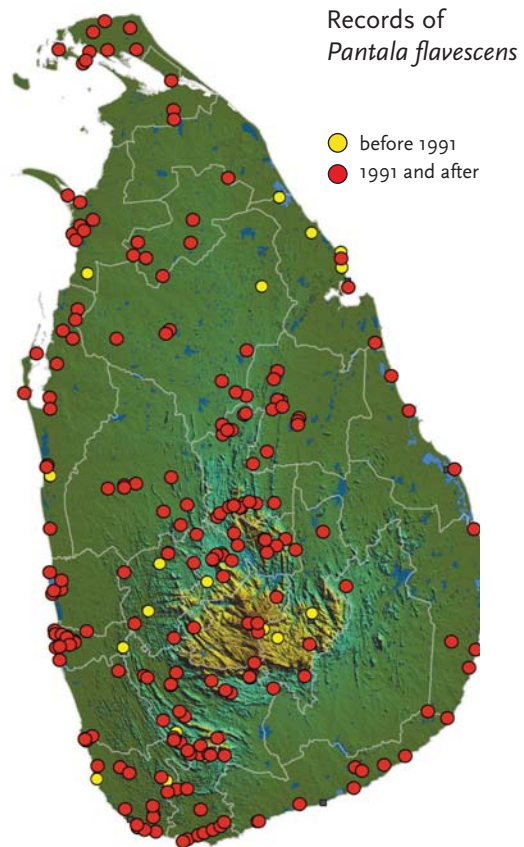
Wandering Glider

Regarded as the most ubiquitous dragonfly in the world, *Pantala flavescens* deserves its common name in full. It has been recorded on all continents except Antarctica. It has migratory tendencies and it was suggested that with the great help of seasonal winds the species is able to accomplish a remarkable travel from northern India, along the subcontinent to the Maldives, and even beyond, across the ocean towards eastern Africa (ANDERSON, 2009; HOBSON et al., 2012).

The dirty red, orange or sandy coloured body, marked sparsely with black on the dorsum of the abdomen and the very broad hind wings with a small amber yellow spot at the base are key identification marks to look for.

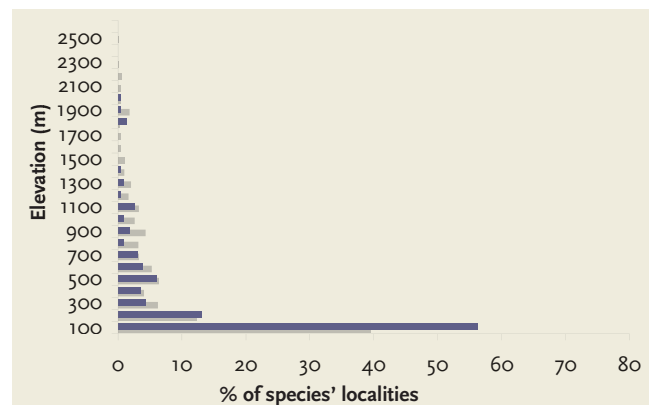
This species belongs to the most opportunistic of breeders—even finding a muddy water hole on a dirt road can be enough to start a breeding frenzy and immediate egg-laying responses. Apart from extreme dispersal affinity, another secret of their success is very rapid larval development, which can be completed in just over one month.

In certain periods, most notably from October to December, aggregations of dozens of insects swarm literally everywhere, from coastline to swampy areas and paddy fields in the interior of the island. Occasionally, migrating swarms of *P. flavescens* can be observed in clouds of innumerable individuals, as reported for the coast near Colombo in October 2011 by RODRIGO (2011; 2012).



Number of all localities: **245** after 1990: **204**

Number of all records: **350** after 1990: **292**





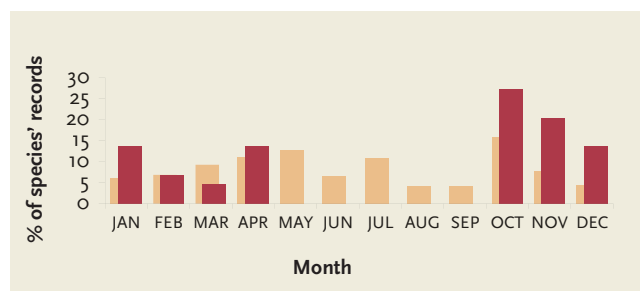
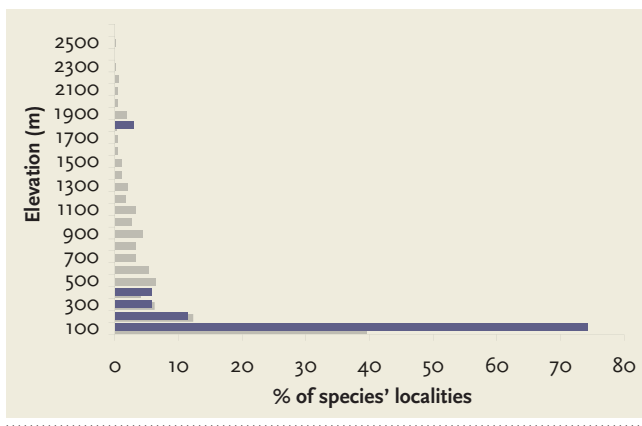
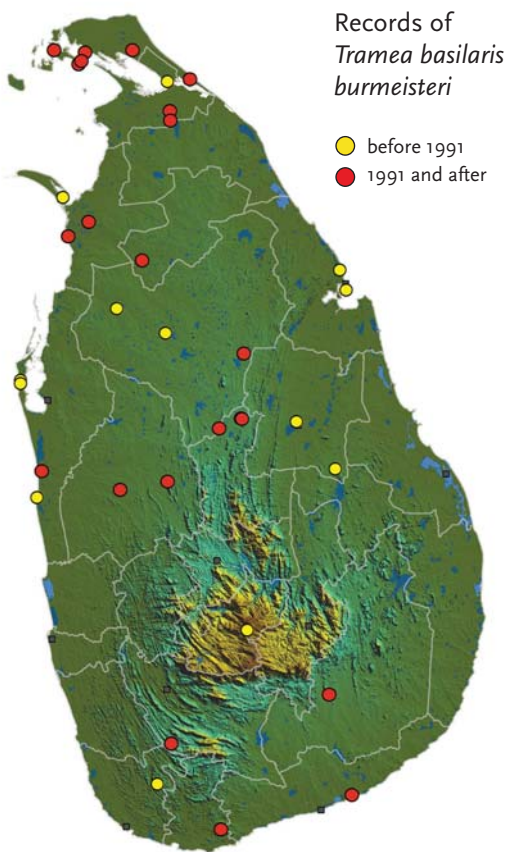
Tramea basilaris burmeisteri Kirby, 1889

Burmeister's Glider

This high-flying dragonfly is also called the Keyhole Glider or Saddlebags Glider because of the small window of yellow within the dark amber basal spots in the hind wings. The surrounding golden yellow aureole around the irregular dark spots and reddish wing veins just add to the attractiveness of this main determination characteristic of *Tramea basilaris burmeisteri*. The adult male's bright red abdomen and black markings are similar to its next congener. Females and juvenile males have a yellow thorax with black stripes and a yellowish-orange abdomen, marked with brownish black at each suture and black towards the end including very long anal appendages.

Relatively few records on the distribution of *T. basilaris burmeisteri* in Sri Lanka have been gathered, perhaps due to less intensive fieldwork in the dry northern and eastern parts of the island; perhaps though it is highly seasonal or just naturally rare. According to FRASER (1936) it breeds in small weedy tanks and marshes. Males and females can be observed sitting on the tips of branches of dry scrub some metres above the ground and from a frog's perspective their characteristic wing markings beautifully contrast with the sky.

This species also occurs in India, Nepal, Myanmar, Thailand and Vietnam, but it is increasingly rare towards the east.



Number of all localities: 35

after 1990: 22

Number of all records: 46

after 1990: 30

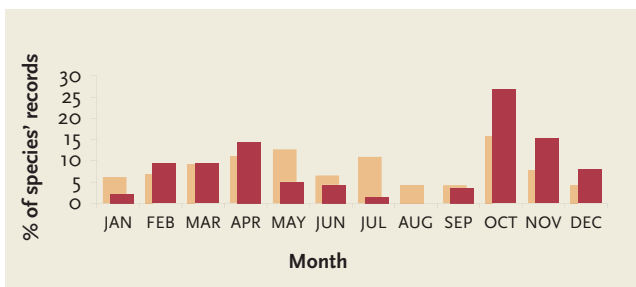
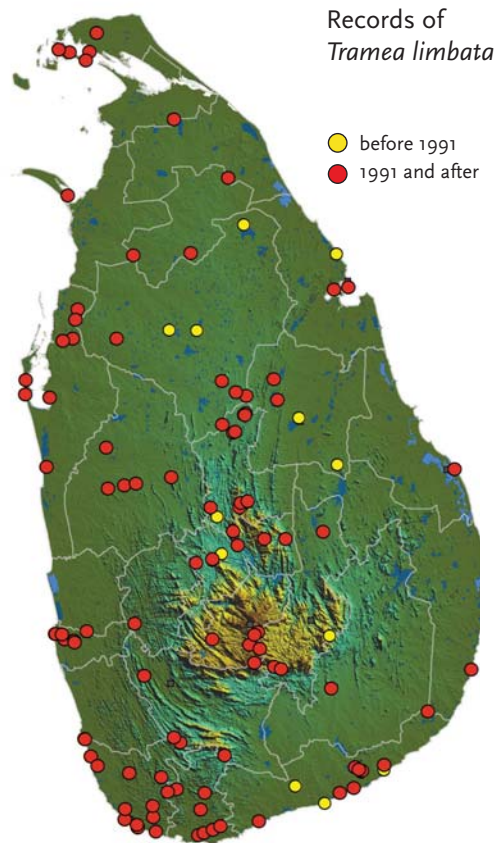
Tramea limbata (Desjardins, 1832)

Sociable Glider

The dark blood-red abdomen, terminating in black with long tapering anal appendages and narrow dark basal patches on their hind wings, are easily recognizable and catch the eye even when *Tramea limbata* is just flying past. It will be found restlessly patrolling over swimming pools, small ponds, open marsh and reservoirs looking for prey and breeding in weedy areas.

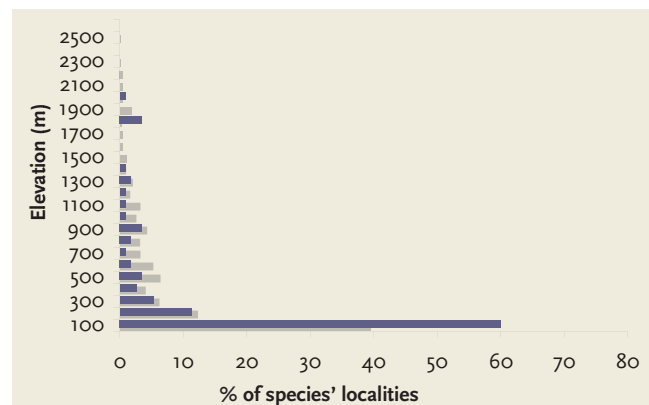
T. limbata is widely distributed throughout India and Sri Lanka and has also been recorded from Nepal. However, the main range of this migrant species extends far to the west, over the southern coast of the Arabian Peninsula, the East African coast including Madagascar and nearby islands and even further west to Sub-Saharan Africa.

It is common all over Sri Lanka, predominantly in the lowlands, but scattered at all elevations. The peak of its flight season seems to be between February and April and October to December, but actually it is present here and there the whole year round.



Number of all localities: **119** after 1990: **101**

Number of all records: **164** after 1990: **139**





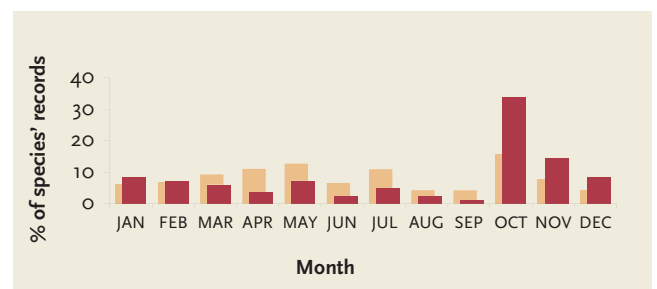
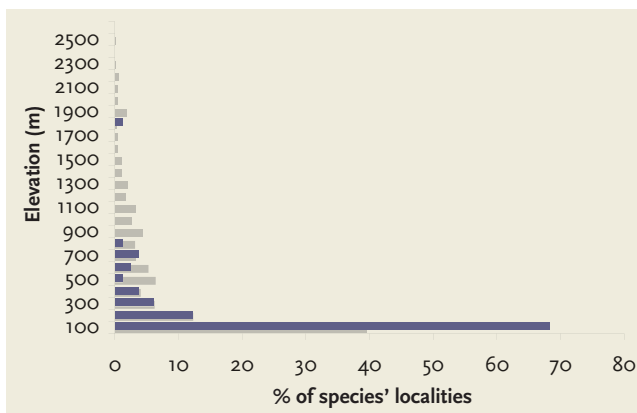
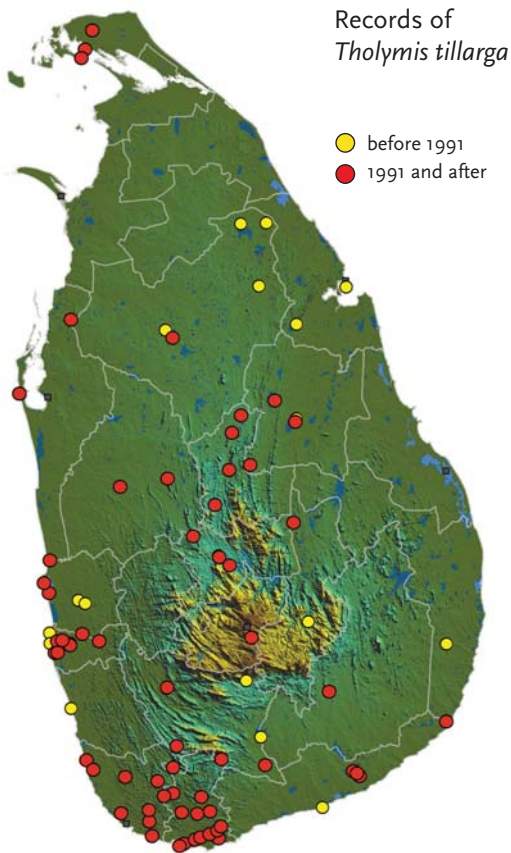
Tholymis tillarga (Fabricius, 1798)

Foggy-winged Twister

The unique whitish markings on the hind wings of the male of *Tholymis tillarga* are almost all one can see when in the dusk they swiftly sweep back and forth over the water with a twisting pattern while catching and eating mosquitoes and other small insects.

It is a crepuscular flyer with a lovely brown marking and a white opalescent spot on the hind wings and a light red abdomen terminating with long tapering anal appendages. The female is stouter, olivaceous coloured and has wings less coloured. In contrast to its vivacious evening activities, during the day both sexes usually rest hanging pendulously in jungles and heavily vegetated areas next to water.

T. tillarga is commonly seen over canals and small ditches or along the edge of vegetated reservoirs. It is found throughout the year, all over Sri Lanka, but predominantly at the low elevations. It is a migratory species, though this has not been reported for Sri Lanka, and has an extensive distribution, ranging from tropical Africa, over the Middle East, India, east and southeast Asia, as far as Australia and Oceania.



Number of all localities: **82** after 1990: **63**

Number of all records: **114** after 1990: **87**

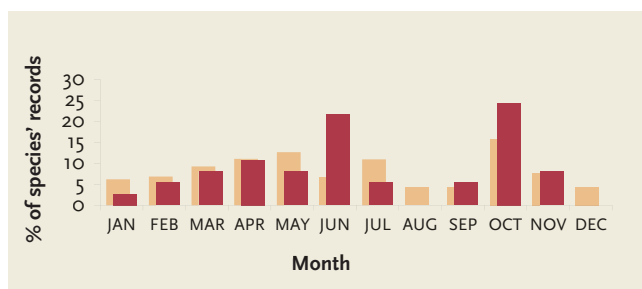
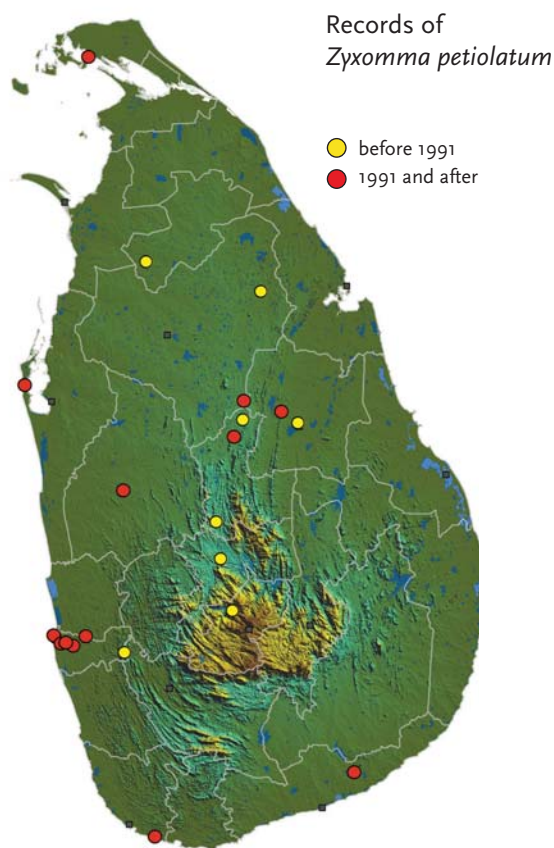
Zyxomma petiolatum Rambur, 1842

Dingy Duskflyer

Just contrary to the daily field activity pattern of odonatologists are the habits of *Zyxomma petiolatum*, which is a crepuscular dragonfly, emerging on the wing only shortly before dusk and preferring to rest in thick brush during the sunny day. It is a rapid flyer, almost invisible when it consumes hundreds of mosquitoes as it loops around over still water in the evenings.

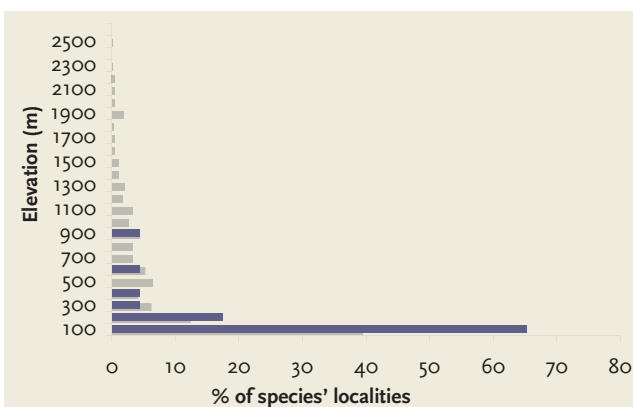
The male and female of *Z. petiolatum* are characterized by a slim cylindrical abdomen with an unusual large swelling at the first three segments. Both have glimmering emerald-green eyes, and their wings are often tinted brown, especially at the tips. The body colour in males is dark blackish brown and in females rusty red to brown with black sutures.

Z. petiolatum inhabits large reservoirs, slow rivers, lagoons and small pools predominantly at lower elevations. It is not easy to spot and due to its habits, conflicting with the usual odonatological fieldwork timing, the species seems to be largely under-recorded in Sri Lanka. Otherwise, it has a very wide distribution from the Seychelles and Mauritius in the west, all over Southeast Asia, to Papua New Guinea and Australia in the east.



Number of all localities: **23** after 1990: **14**

Number of all records: **43** after 1990: **33**





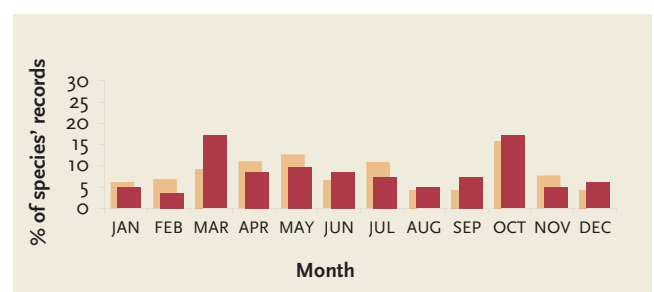
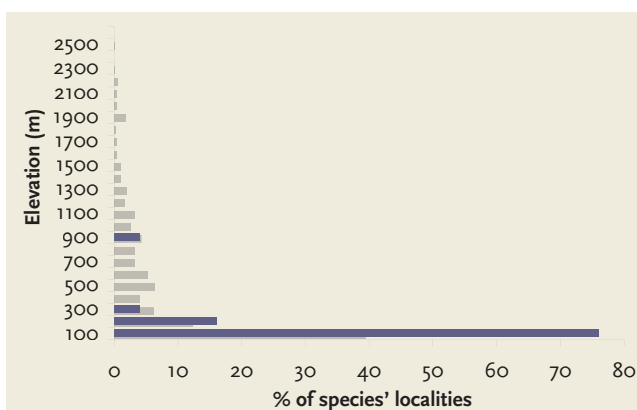
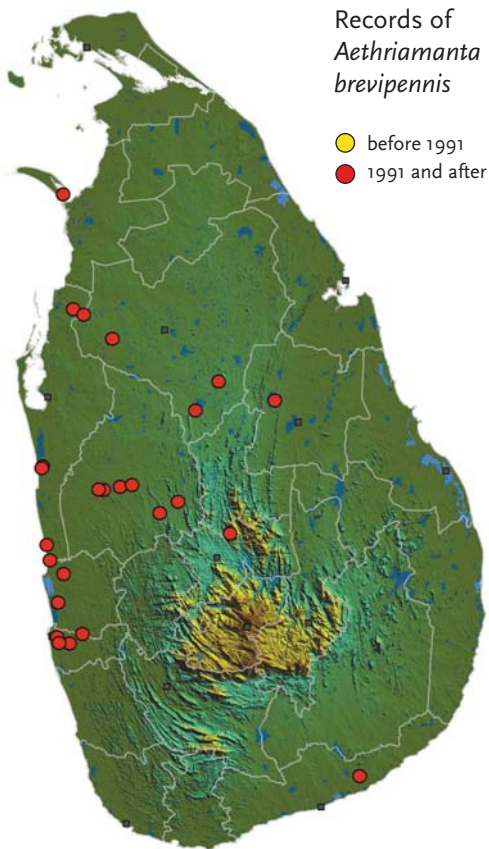
Aethriamanta brevipennis *brevipennis* (Rambur 1842)

Elusive Adjutant

Small size and the brilliant red dilated abdomen of the males, contrasting with their brownish black thorax and head, or the charming golden yellow on tenerals and females, reveal the identity of *Aethriamanta brevipennis* at a glance. A characteristic small spot of red or yellow on the hind femur and a mix of yellow and brown mottling placed at the bright-veined base of this small creature's wings, allows no confusion with any other species.

Without any details, *A. brevipennis* was first mentioned for Sri Lanka by SELYS (1897) but no exact faunistic records were known for almost another 100 years. Nancy van der Poorten first recorded it on a coconut property in the North Western province in 1996, where it is common all year round. In the following years, many observations and photographs followed by Gehan de Silva Wijeyeratne, Amila Salgado, Karen Conniff and others from the western, northern and central parts of the island. The majority of the records originate from March to October but apparently it is on the wing the whole year round.

A. brevipennis can be found perched in wooded areas or brush next to reservoirs or small ponds and can be locally common. In the sunlight it will often obelisk its body to deflect the sun. Apart from Sri Lanka, the nominotypical subspecies occurs in southern and eastern India, Bangladesh, Myanmar, Thailand, Peninsular Malaysia and Sumatra.



Number of all localities: 25

after 1990: 25

Number of all records: 86

after 1990: 86

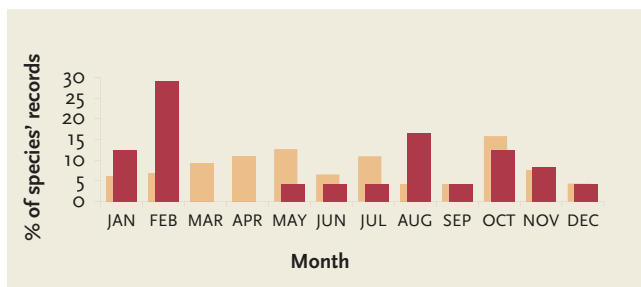
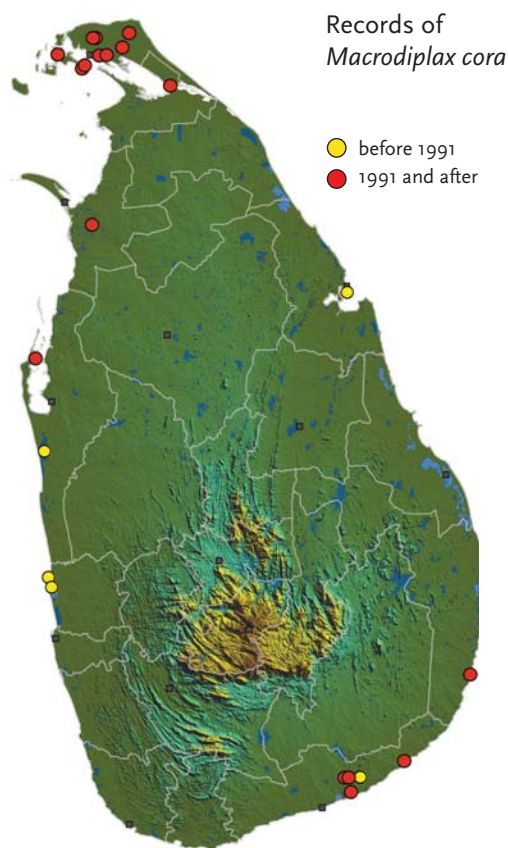
Macrodiplax cora (Kaup, 1867)

Coastal Pennant

Another impressive dragonfly, prone to migrations, with a passport to different continents and zoogeographical regions is *Macrodiplax cora*. It is a medium-sized dragonfly with hyaline wings except for a narrow amber yellow band in the basal area of the hind wings. Both sexes have a distinct broken pattern of black along the dorsum. Males sport a cherry red abdomen and thorax while females and young males are orange-yellow.

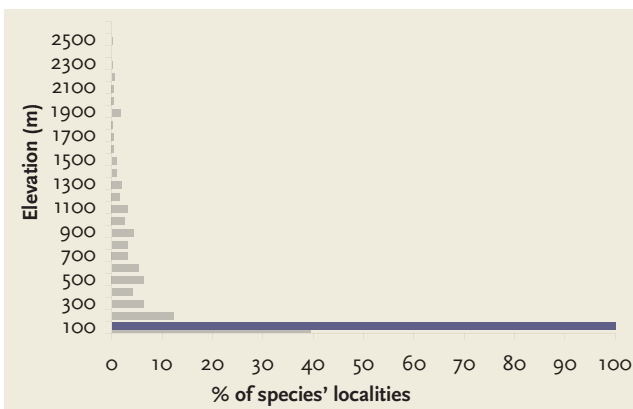
M. cora has a wide distribution, reaching from southeast Africa, all over southeast and east Asia to Japan, and towards the southeast as far as Australia, Papua New Guinea and Samoa. Its larvae live in marshes and can also survive in the brackish waters of coastal lagoons and estuaries.

In Sri Lanka it also occurs in the lowlands near the coast. It is probably more common than evident from the current distribution map. Indeed, future fieldwork along the beautiful beaches of Sri Lanka in the September to February season might be also odonatologically rewarding considering this species.



Number of all localities: **22** after 1990: **17**

Number of all records: **24** after 1990: **19**





Urothemis signata signata (Rambur, 1842)

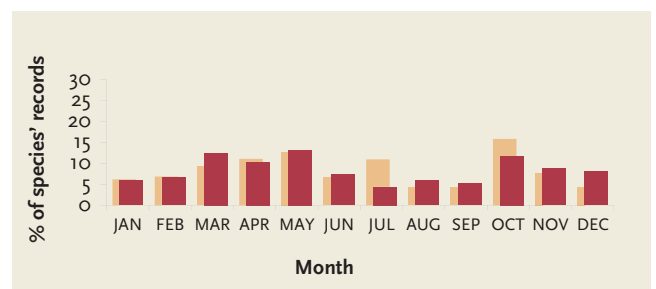
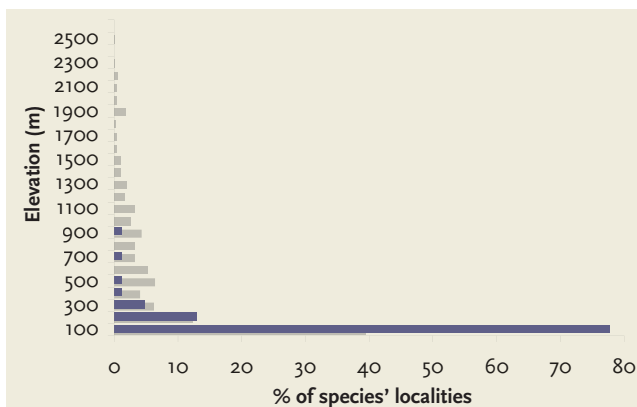
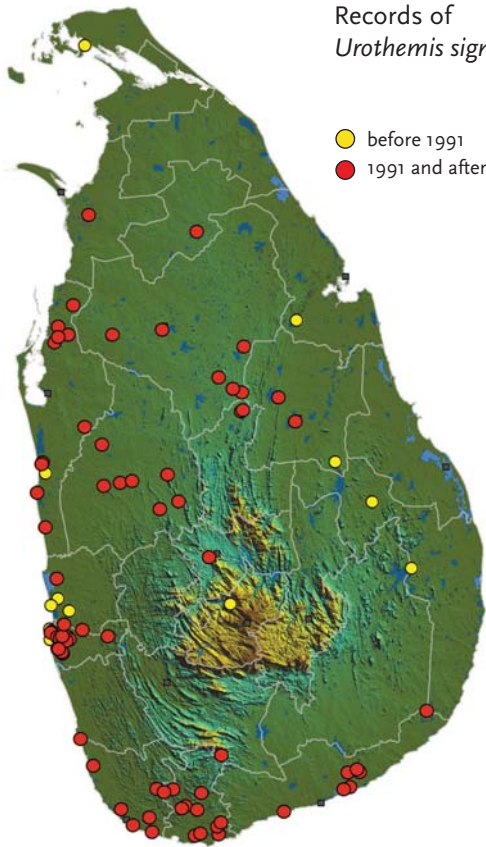
Scarlet Basker

The very last in the company of those confusing red dragonflies is *Urothemis signata*. What makes it different are the speckled black patches on the eighth and ninth abdominal segments, crimson nervures in the wings, and above all, a distinct oval patch of reddish brown or dark brown surrounded by golden in the hind wings. Young males are orange-yellow. Females are orange-yellow or olivaceous in colour, with a charming black pattern on the body and a very prominent ovipositor. Androchrome females have also been recorded.

Weedy tanks, marshes and vegetated channels are the preferred habitats of *U. signata*. Males are usually seen perching on branches or stems near the water while females are fairly common away from water. On hot sunny days, males raise their abdomen up towards the sun in an obelisk position to reduce sunburn and heat.

It is common in the lowlands all over the island, throughout the year. The nominotypical subspecies is known from Sri Lanka, all of India, Bangladesh, Nepal, Myanmar, Thailand, Vietnam, China and Hong Kong.

Records of
Urothemis signata



Number of all localities: **87**

after 1990: **72**

Number of all records: **158**

after 1990: **132**

Zygonyx iris ceylonicus (Kirby, 1905)

Sri Lankan Cascader

ENDEMIC

Beautiful cascades and waterfalls of Sri Lankan rivulets would just not be complete without *Zygonyx iris ceylonicus*. Uninterrupted gliding of this endemic Cascader over the white rapids, swift turns and skilful avoidance of sparkling water drops is elegance in itself.

Z. iris ceylonicus is one of the largest representatives of the family and its very long and broad wings perfectly serve its lifestyle. Its dark metallic blue or purplish face and very dark, slightly metallic body are only very sparsely marked with yellow. In females, the yellow colouration on the thorax and abdomen is more pronounced and their dark ground tone has a soft metallic green shine.

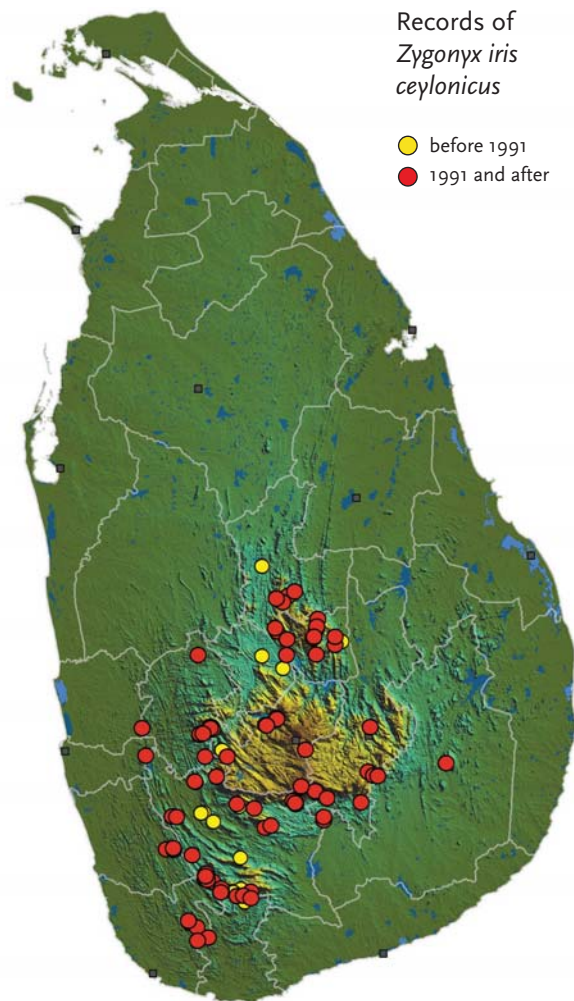
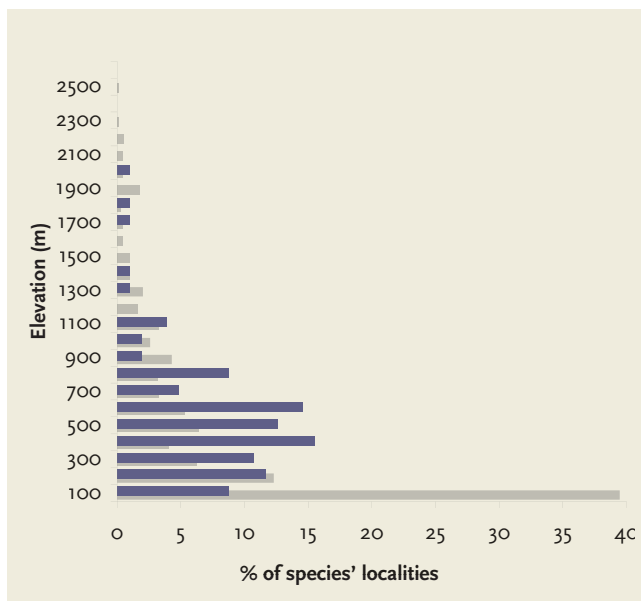
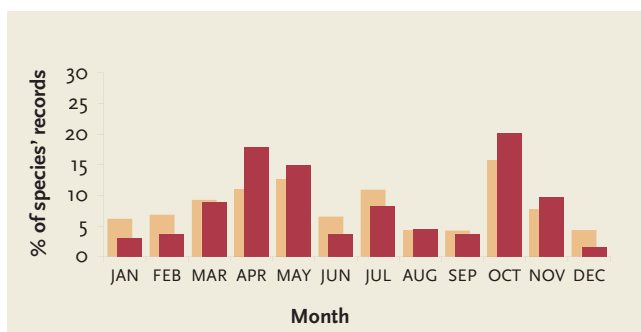
The species was described as *Zygonidia ceylonica* by W. F. Kirby in the beginning of the 20th century, based on specimens from Kandy collected by E. E. Green (KIRBY, 1905). It is of note that it was first, together with material from different regions, synonymised by RIS (1912a) with *Zygonyx iris* but subsequently ranked as a subspecies, together with not less than ten others. Populations from different regions, nowadays considered as subspecies, are distributed from the Western Ghats in India, Nepal, Eastern India and Myanmar to Malaysia, Borneo, China and Hong Kong. According to FRASER (1936), *Z. iris ceylonicus* is peculiar by being very dark, with strongly reduced yellow markings on the thorax and abdomen and by having much longer wings than the nominotypical subspecies.

The larva of *Z. iris ceylonicus* was described and figured by ST. QUENTIN (1973). It is adapted to a turbulent life in fast flowing water, clinging to rocks with strong legs that are equipped with hooked



claws at their ends, while its body is stout and flattened, armoured with strong but blunt dorsal abdominal spines. After emergence the subadult imagoes of both sexes soar in groups over the trees at a considerable height. Mating is only rarely observed, but the oviposition in tandem obviously doesn't need so much privacy and one can easily observe enamoured pairs seeking the right section of a shallow slow flowing river near the banks to lay the foundation for their next generation.

Luckily, the species is obviously still coping well with various human pressures on streams and rivers in southwestern Sri Lanka. It is common at middle elevations all over the wet zone, except the mountains and coastal lowlands, and it also occurs in the intermediate zone. In the National Red List 2012, *Z. iris ceylonicus* is listed as a Vulnerable species (VAN DER POORTEN & CONNIFF, 2012). However, on the global level, based on a more complete dataset and knowledge, it is for now assessed as Least Concern according to the IUCN criteria.



| | |
|--------------------------------------|------------------------|
| Number of all localities: 104 | after 1990: 85 |
| Number of all records: 148 | after 1990: 119 |

| |
|--|
| Extent of Occurrence (EOO): 11,452 km² |
| Area of Occupancy (AOO): 320 km² |

% of records per period:

1850-1920 1921-1990 1991-2013

| | | |
|---|----|----|
| 3 | 17 | 80 |
|---|----|----|

IUCN Red List Criteria: **NOT APPLICABLE**

IUCN Red List Category: **LEAST CONCERN**

References & Synonymy:

Zygonidia ceylonica, Kirby, 1905, Ann. Mag. nat. Hist. (VII) 15 (87): 273-275.

Zygonidia ceylonica - Kirby (1905): 273-275; *Zygonyx iris* - Ris (1912a): 820, 822; LAIDLAW (1924): 348; IUCN SRI LANKA (2000): 27; BEDJANIĆ et al. (2006): pl. 21; VAN DER POORTEN (2012c) in PETHIYAGODA (2012): 185; VAN DER POORTEN & CONNIFF (2012) in MOE (2012): 8; *Zygonyx iris ceylanica* - FRASER (1926a): 766; FRASER (1936): 393, 396-397; LIEFTINCK (1955): 79; LIEFTINCK (1971a): 205, 207; COSTA & STARMÜHLNER (1972): 51; ST. QUENTIN (1973): 122-123, figs. 10-12; STARMÜHLNER (1984): 224, 230; TSUDA (1986): 174, 229; *Zygonyx iris ceylonica* - LAIDLAW (1951): 80; KIMMINS (1968): 283; BEDJANIĆ (1998): 9-10, 15, 56, 60, 63, 78; BEDJANIĆ (2002): 6, 16; *Zygonyx iris ceylonicus* - DAVIES & TOBIN (1985): 144; VAN TOL (1992): 62; DE FONSEKA (2000): 14-15, 37, 142, 194-195, 259, 284 figs. C66a-b; DE SILVA WIJEYERATNE et al. (2003): pl. 7; *Zygonyx iris ceylonicum* - BEDJANIĆ et al. (2007): 17, 230-231; WCSG (2008): 16; WCSG (2009): 15; DE SILVA WIJEYERATNE (2012b) in PETHIYAGODA (2012): 188; *Zygonyx iris ceylanici* (sic!) - FERNANDO (1964): 191; FERNANDO (1990): 187;

Chapter 7

IUCN RED LIST ASSESSMENTS OF GLOBALLY THREATENED ENDEMIC DRAGONFLY SPECIES OF SRI LANKA

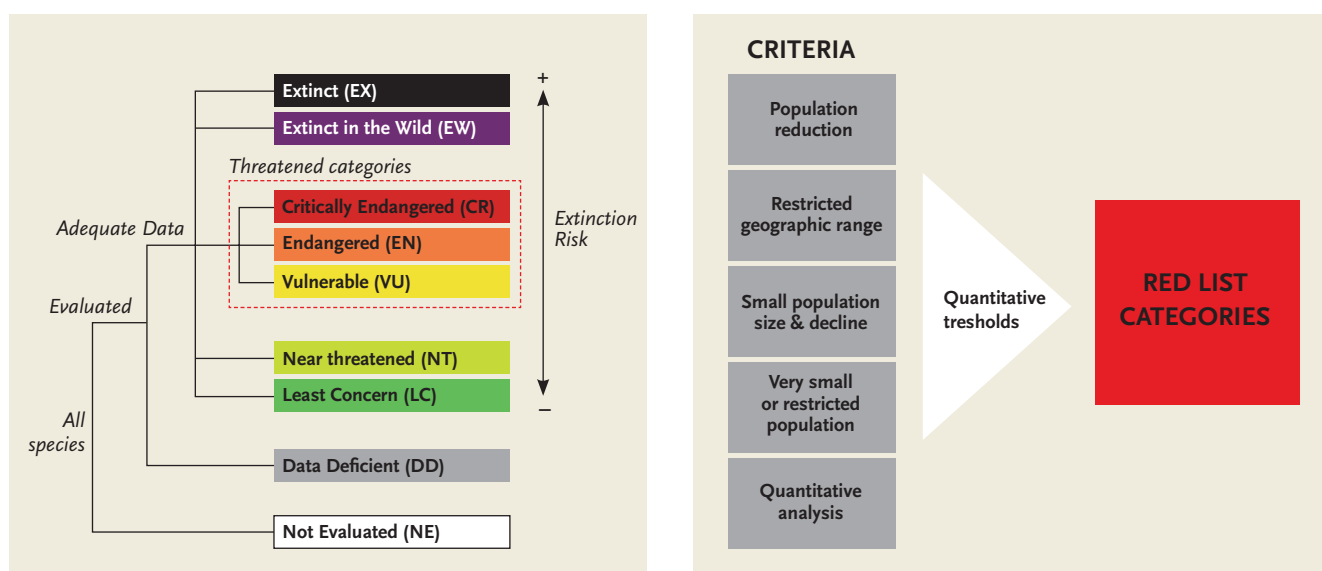
The dragonfly fauna of Sri Lanka is remarkable on a global scale because of the very high levels of endemism and species diversity in some genera and families (BEDJANIĆ, 2004; 2006b; KALKMAN et al., 2008). Unfortunately, the fate of several endemic dragonfly species is unsure. The main reason for this alarming situation is habitat loss due to the ongoing manifold pressures on natural habitats and resources, which is in large part a consequence of Sri Lanka's high population density. The destruction and fragmentation of rainforests has approached catastrophic levels in the last few decades.

In the 1950s, Sri Lanka had more than 50% forest cover—well above the world average and above the average for Asian countries. By the end of the 1980s the figure was only slightly over 20%, with 12,000 – 17,000 km² remaining. Relatively large continuous patches of dry lowland forest are still left in the northwestern, northeastern and southeastern parts of the island. The situation is quite different, however, for the wet zone, which is the centre of the island's endemism and biodiversity, including the dragonfly fauna. The wet zone, covering an area of 22,500 km² now has only 9% of its surface covered by natural forests. Out of that, only about 445 km² are thought to be undisturbed, which represents only 2% of the original extent of natural forest (ERDELEN, 1988; MITTERMEIER et al., 2000). As shown by MATSSON et al. (2012), forest clearing and encroachment continues, mainly by small-scale farmers for rice and tea cultivation. The forest cover of Sri Lanka has decreased by half in the past 50

years and the future of the island's forests remains precarious.

Habitat loss and encroachment in the central and southwestern part of Sri Lanka is also caused by the destruction of buffer forest corridors along streams, river impoundment, water extraction for irrigation and consumption, soil erosion, siltation, over-use of agricultural chemicals and careless pollution of rivers and streams. All of these threats negatively affect dragonfly fauna both directly and indirectly and have brought many endemic dragonfly species close to the brink of extinction.

The IUCN Red List is an internationally accepted system to describe and quantify the extinction risk of flora and fauna. It is the world's most comprehensive source on the global conservation status of animal, fungi and plant species. The IUCN Red List is the starting point for conservation action, based on an objective system for assessing the risk of extinction of a species based on past, present, and projected threats. Species assessments are conducted following a standardized process using the IUCN Red List Categories and Criteria, ensuring the necessary standards of scientific documentation, information management, expert review, and justification. There are eight IUCN Red List Categories based on criteria linked to population trend, size and structure, and geographic range. Species listed as Critically Endangered, Endangered or Vulnerable are collectively described as threatened (IUCN, 2012; 2013).



The structure of Red List Categories and Criteria used in the present publication in accordance with the *IUCN Red List Categories and Criteria: Version 3.1*. (IUCN, 2012; 2013).

On a global level, Odonata were the first of the insect orders assessed as a group using IUCN's Red List criteria (CLAUSNITZER et al., 2009). Based on a randomly selected sample of more than a quarter of all described dragonfly species, including some from Sri Lanka, a quite surprising general conclusion was reached—on average, only 1 in 10 species of dragonflies and damselflies worldwide is threatened with extinction. However, the threats and the consequent extinction risks are unevenly distributed. In this respect, Sri Lanka has been clearly recognized as a region with a high percentage of threatened endemics, which are restricted to isolated habitat islands of remnant forest patches (CLAUSNITZER et al., 2009).

One of the important objectives of the present publication has been to document the global threat status of all dragonfly species and subspecies endemic to Sri Lanka. Three Red Lists of threatened dragonfly species of Sri Lanka have been prepared at the regional level since 2000—*The 1999 List of Threatened Fauna and Flora of Sri Lanka* (IUCN SRI LANKA, 2000), *The 2007 Red List of Threatened Fauna and Flora of Sri Lanka* (IUCN SRI LANKA & MINISTRY OF ENVIRONMENT AND NATURAL RESOURCES, 2007) and *The National Red List 2012 of Sri Lanka* (MOE, 2012). However, no comprehensive assessment

of the threat status of all of the island's endemic dragonflies has been done using the global-level IUCN Red List Categories and Criteria (IUCN, 2012; 2013). The partial exception were the assessments for a subset of the species done for the global IUCN Red List by BEDJANIĆ (2006a, 2009b), that resulted in the official declaration of 20 endemic dragonflies from Sri Lanka as globally threatened on the IUCN Red List of Threatened Species. More than half of the island's endemics have never been assessed. In general, until the recent past the available data and knowledge on the threatened endemic species was very scarce and fragmented in many instances.

However, based on a much larger dataset and accumulation of new data gained by targeted field work in the last four years, more detailed assessments of the threat status of all 57 described endemic species and subspecies according to the global IUCN criteria have been carried out and are presented in this publication. A summary of the assessment for each endemic species and subspecies is given in CHAPTER 6. It includes distribution overview, number of localities, calculations of Extent of Occurrence and Area of Occupancy, threats, as well as research and conservation recommendations. All key data are summarized in tabular form below. Four endemic representatives of the family Platystictidae, which are

in the process of description and are preliminarily presented in CHAPTER 6, are not included in the assessments since IUCN Red List guidelines discourage the listing of undescribed taxa.

It is important to stress that the presented assessments, although published, do not have formal status as yet and must be regarded as preliminary. According to the strictly defined protocol all completed global-level assessments must be sub-

mitted to the IUCN Red List Unit for final review and checking. For the present case, species files will be submitted and the review process will take place in the frame of the IUCN Species Survival Commission – Odonata Specialists Group. The assessments of threat status and the official global Red List Category of the species are expected to be ready for official publication on the IUCN Red List of Threatened Species website in the next few months.

Summary of data and assessment of threat status of all 57 described endemic dragonfly species and subspecies from Sri Lanka according to IUCN Red List Criteria and Categories (IUCN 2012; 2013).

Abbreviations: SPECIES – name of species and subspecies; Loc ALL – number of all known species' localities; Loc>1990 – number of localities with records after 1990; EOO (km²) – Extent of Occurrence in square kilometres; AOO (km²) – Area of Occupancy in square kilometres; IUCN RED LIST - VERSION 2013.1 – summary of IUCN Category and Criteria for taxa already included on the IUCN Red List of Threatened Species (www.iucnredlist.org), with citation of original assessments; STATUS – indication of change between current published Red List status and assessments in this publication; IUCN CRITERIA – IUCN Red List Category, Criteria and Subcriteria from assessments in this publication, according to IUCN (2012, 2013), N.A. – not applicable; IUCN CATEGORY – IUCN Red List Category from assessments in this publication, according to IUCN (2012), CR - Critically Endangered, EN – Endangered, VU – Vulnerable, DD – Data Deficient, NT – Near Threatened, LC – Least Concern. Species names and IUCN categories are colour-coded according to threat status: CR–red; EN–orange; VU–yellow; DD–gray; NT–lime green; LC–green.

| SPECIES | Loc ALL | Loc>1990 | EOO (km ²) | AOO (km ²) | IUCN RED LIST - VERSION 2013.1 | STATUS | IUCN CRITERIA | IUCN CATEGORY |
|--|---------|----------|------------------------|------------------------|---|--------------|--------------------------------|---------------|
| <i>Vestalis apicalis nigrescens</i> | 224 | 166 | 20,492 | 712 | / | NEW | N.A. | LC |
| <i>Libellago adami</i> | 91 | 65 | 41,615 | 324 | / | NEW | N.A. | LC |
| <i>Libellago corbeti</i> | 13 | 12 | 452 | 40 | / | NEW | EN B1ab(iii)+2ab(iii) | EN |
| <i>Libellago finalis</i> | 72 | 50 | 10,325 | 228 | / | NEW | N.A. | NT |
| <i>Libellago greeni</i> | 109 | 82 | 22,522 | 368 | / | NEW | N.A. | LC |
| <i>Euphaea splendens</i> | 356 | 272 | 19,960 | 1,040 | / | NEW | N.A. | LC |
| <i>Sinhalestes orientalis</i> | 8 | 7 | 460 | 24 | CR B1ab(iii)+2ab(iii) - BEDJANIČ (2006a, 2009b) | NO CHANGE | CR B1ab(iii)+2ab(iii) | CR |
| <i>Indolestes divisus</i> | 12 | 8 | 4,846 | 40 | / | NEW | EN B1ab(iii)+2ab(iii) | EN |
| <i>Indolestes gracilis gracilis</i> | 47 | 24 | 2,718 | 124 | / | NEW | VU B1ab(iii)+2ab(ii,iii,iv) | VU |
| <i>Mortonagrion ceylonicum</i> | 11 | 8 | 3,242 | 36 | DD - BEDJANIČ (2009b) | CHANGE | EN B1ab(iii)+2ab(iii) | EN |
| <i>Pseudagrion rubriceps ceylonicum</i> | 149 | 115 | 55,800 | 532 | / | NEW | N.A. | LC |
| <i>Archibasis lieftincki</i> | 6 | 6 | 136 | 20 | / | NEW | EN B1ab(iii)+2ab(iii) | EN |
| <i>Archibasis oscillans hanwellanensis</i> | 1 | 1 | 4 | 4 | / | NEW | N.A. | DD |
| <i>Drepanosticta anamia</i> | 28 | 24 | 3,440 | 92 | / | NEW | VU B1ab(ii,iii)+2ab(ii,iii) | VU |

| SPECIES | Loc ALL | Loc>1990 | EOO (KM²) | AOO (KM²) | IUCN RED LIST - VERSION 2013.1 | STATUS | IUCN CRITERIA | IUCN CATEGORY |
|----------------------------------|---------|----------|-----------|-----------|---|--------------|---|---------------|
| <i>Drepanosticta adami</i> | 5 | 4 | 47 | 12 | CR B1ab(ii, iii)+2ab(ii, iii) - BEDJANIĆ (2006a) | NO CHANGE | CR B1ab(ii, iii)+2ab(ii, iii) | CR |
| <i>Drepanosticta austeni</i> | 29 | 28 | 2,885 | 88 | CR B1ab(ii, iii)+2ab(ii, iii) - BEDJANIĆ (2006a) | CHANGE | VU B1ab(ii,iii)+2ab(ii,iii) | VU |
| <i>Drepanosticta bine</i> | 23 | 19 | 4,274 | 72 | / | NEW | VU B1ab(ii,iii)+2ab(ii,iii) | VU |
| <i>Drepanosticta brincki</i> | 55 | 45 | 5,501 | 176 | / | NEW | N.A. | LC |
| <i>Drepanosticta digna</i> | 6 | 4 | 390 | 28 | / | NEW | EN B1ab(ii,iii)+2ab(ii,iii) | EN |
| <i>Drepanosticta hilaris</i> | 11 | 8 | 1,191 | 36 | CR B1ab(iii)+2ab(iii) - BEDJANIĆ (2006a, 2009b) | CHANGE | EN B1ab(ii,iii)+2ab(ii,iii) | EN |
| <i>Drepanosticta lankanensis</i> | 61 | 48 | 5,305 | 184 | / | NEW | N.A. | LC |
| <i>Drepanosticta mojca</i> | 6 | 4 | 1,507 | 24 | / | NEW | EN B1ab(ii,iii)+2ab(ii,iii) | EN |
| <i>Drepanosticta montana</i> | 11 | 9 | 1,065 | 40 | CR B1ab(iii)+2ab(iii) - BEDJANIĆ (2006a) | CHANGE | EN B1ab(ii,iii)+2ab(ii,iii) | EN |
| <i>Drepanosticta nietneri</i> | 28 | 19 | 5,319 | 108 | / | NEW | VU B1ab(ii,iii)+2ab(ii,iii) | VU |
| <i>Drepanosticta submontana</i> | 12 | 10 | 285 | 36 | CR B1ab(ii, iii)+2ab(ii, iii) - BEDJANIĆ (2006a) | CHANGE | EN B1ab(ii,iii)+2ab(ii,iii) | EN |
| <i>Drepanosticta subtropica</i> | 2 | 0 | 8 | 8 | / | NEW | CR B1ab(ii,iii)+2ab(ii,iii,iv) | CR |
| <i>Drepanosticta tropica</i> | 14 | 10 | 1,872 | 48 | / | NEW | EN B1ab(ii,iii)+2ab(ii,iii) | EN |
| <i>Drepanosticta walli</i> | 22 | 17 | 1,257 | 68 | DD - BEDJANIĆ (2009b) | CHANGE | EN B1ab(ii,iii)+2ab(ii,iii) | EN |
| <i>Platysticta apicalis</i> | 45 | 37 | 7,912 | 148 | / | NEW | N.A. | NT |
| <i>Platysticta maculata</i> | 36 | 30 | 1,562 | 96 | / | NEW | VU B1ab(ii,iii)+2ab(ii,iii) | VU |
| <i>Elattonura caesia</i> | 89 | 73 | 12,214 | 276 | EN B1ab(ii,iii)+2ab(ii,iii) - BEDJANIĆ (2006a, 2009b) | CHANGE | N.A. | NT |
| <i>Elattonura centralis</i> | 183 | 147 | 31,294 | 620 | / | NEW | N.A. | LC |
| <i>Elattonura leucostigma</i> | 4 | 2 | 166 | 12 | CR B1ab(ii, iii)+2ab(ii, iii) - BEDJANIĆ (2006a, 2009b) | NO CHANGE | CR B1ab(ii, iii)+2ab(ii, iii) | CR |
| <i>Disparoneura ramajana</i> | | | | | CR B1ab(ii, iii)+2ab(ii, iii) - BEDJANIĆ (2006a) | DELETION | Synonymized by BEDJANIĆ (2012b), see <i>Elattonura leucostigma</i> | |
| <i>Elattonura oculata</i> | 52 | 50 | 5,973 | 180 | EN B1ab(ii,iii)+ 2ab(ii,iii) - BEDJANIĆ (2009b) | CHANGE | VU B1ab(ii,iii)+2ab(ii,iii) | VU |
| <i>Elattonura tenax</i> | 48 | 35 | 7,124 | 168 | / | NEW | VU B1ab(ii,iii)+2ab(ii,iii) | VU |
| <i>Prodasineura sita</i> | 145 | 107 | 40,933 | 500 | / | NEW | N.A. | LC |
| <i>Anisogomphus ceylonicus</i> | 2 | 0 | 8 | 8 | / | NEW | CR B1ab(ii,iii)+2ab(ii,iii) | CR |
| <i>Anisogomphus solitaris</i> | | | | | CR B1ab(iii)+2ab(iii) - BEDJANIĆ (2006a) | DELETION | Synonymized by BEDJANIĆ & VAN DER POORTEN (2013), see <i>Anisogomphus ceylonicus</i> | |

| SPECIES | Loc ALL | Loc>1990 | EOO (KM²) | AOO (KM²) | IUCN RED LIST - VERSION 2013.1 | STATUS | IUCN CRITERIA | IUCN CATEGORY |
|--|---------|----------|-----------|-----------|--|--------------|---|---------------|
| <i>Burmagomphus pyramidalis sinuatus</i> | 17 | 12 | 8,350 | 64 | / | NEW | VU B1ab(iii)+2ab(iii) | VU |
| <i>Cyclogomphus gynostylus</i> | 24 | 16 | 41,608 | 84 | VU B1ab(iii)+2ab(iii) - BEDJANIČ (2006a) | NO CHANGE | VU B1ab(iii)+2ab(iii) | VU |
| <i>Heliogomphus ceylonicus</i> | | | | | CR B1ab(iii)+2ab(iii) - BEDJANIČ (2006a, 2009b) | DELETION | Synonymized by BEDJANIČ & VAN DER POORTEN (2013), see <i>Anisogomphus ceylonicus</i> | |
| <i>Heliogomphus lyratus</i> | 3 | 2 | 1,769 | 12 | CR B1ab(iii)+2ab(iii) - BEDJANIČ (2006a) | NO CHANGE | CR B1ab(ii,iii)+2ab(ii,iii) | CR |
| <i>Heliogomphus nietneri</i> | 3 | 2 | 389 | 12 | CR B1ab(iii)+2ab(iii) - BEDJANIČ (2006a) | NO CHANGE | CR B1ab(ii,iii)+2ab(ii,iii) | CR |
| <i>Heliogomphus walli</i> | 52 | 46 | 11,165 | 188 | NT - BEDJANIČ (2009b) | NO CHANGE | N.A. | NT |
| <i>Macrogomphus annulatus keiseri</i> | 3 | 0 | 475 | 12 | / | NEW | N.A. | DD |
| <i>Macrogomphus lankanensis</i> | 30 | 23 | 31,529 | 112 | VU B1ab(iii)+2ab(iii) - BEDJANIČ (2006a, 2009b) | NO CHANGE | VU B1ab(iii)+2ab(iii) | VU |
| <i>Microgomphus wijaya</i> | 21 | 16 | 8,382 | 80 | EN B1ab(iii)+2ab(iii) - BEDJANIČ (2006a, 2009b) | CHANGE | VU B1ab(iii)+2ab(iii) | VU |
| <i>Megalogomphus ceylonicus</i> | 22 | 17 | 9,764 | 88 | / | NEW | VU B1ab(iii)+2ab(iii) | VU |
| <i>Paragomphus campestris</i> | 7 | 5 | 11,725 | 24 | / | NEW | VU B1ab(iii)+2ab(iii) | VU |
| <i>Paragomphus henryi</i> | 66 | 45 | 6,800 | 232 | NT - BEDJANIČ (2009b) | NO CHANGE | N.A. | NT |
| <i>Gomphidia pearsoni</i> | 28 | 24 | 9,812 | 92 | EN B1ab(iii)+2ab(iii) - BEDJANIČ (2006a, 2009b) | CHANGE | VU B1ab(iii)+2ab(iii) | VU |
| <i>Epophthalmia vittata cyanocephala</i> | 40 | 29 | 25,215 | 152 | / | NEW | N.A. | LC |
| <i>Macromia flinti</i> | 1 | 0 | 4 | 4 | CR B1ab(iii)+2ab(iii) - BEDJANIČ (2006a) | NO CHANGE | CR B1ab(iii)+2ab(iii) | CR |
| <i>Macromia zeylanica</i> | 20 | 12 | 7,194 | 80 | / | NEW | VU B1ab(iii)+2ab(iii) | VU |
| <i>Macromidia donaldi pethiyagodai</i> | 8 | 8 | 2,533 | 24 | / | NEW | EN B1ab(iii)+2ab(iii) | EN |
| <i>Hylaeothemis fruhstorferi</i> | 8 | 7 | 104 | 16 | EN B1ab(iii)+2ab(iii) - BEDJANIČ (2006a), Dow (2009b) | CHANGE | CR B1ab(ii,iii,iv)+ 2ab(ii,iii,iv) | CR |
| <i>Tetrathemis yerburii</i> | 38 | 32 | 7,908 | 132 | EN B1ab(iii)+2ab(iii) - BEDJANIČ (2006a) | CHANGE | VU B1ab(iii)+2ab(iii) | VU |
| <i>Lyriothemis defonseikai</i> | 6 | 6 | 8 | 8 | / | NEW | CR B1ab(iii)+2ab(iii) | CR |
| <i>Zygonyx iris ceylonicus</i> | 104 | 85 | 11,452 | 320 | / | NEW | N.A. | LC |

The amount of yellow, orange and red in the table above clearly highlights the general message of the threat status assessments of all the island's endemics that should be evident to everyone—the endemic dragonfly fauna of Sri Lanka is clearly in trouble. Sixty-nine percent of all described endemic species and subspecies are assessed as globally threatened and fall into the IUCN categories of Critically Endangered, Endangered or Vulnerable.

In the table below these data are summarized by category. Although no Sri Lankan dragonfly species has yet been listed in the Extinct category, there are at least three enigmatic endemic dragonflies, viz. *Drepanosticta subtropica*, *Anisogomphus ceylonicus* and *Macromia flinti*, which have not been recorded for several decades. However, since the knowledge of their biology, ecology and habits is very limited and since not all appropriate habitats in the wider surroundings of known localities have been thoroughly researched in all seasons, hope of their rediscovery still exists. A nice example of a very similar story, with a positive outcome, is that of the magnificent endemic damselfly

Sinhalestes orientalis, which was rediscovered at a few localities in 2012 after more than 150 years since its first and one and only record. New data on its habitats, ecology and seasonality are accumulating rapidly since its rediscovery (SUMANAPALA & BEDJANIĆ, 2013). Of course, at the other, highly speculative side of the coin may be taxa that have become extinct in the last two centuries without even being known due to the massive degradation and loss of island's natural habitats.

With a total of 39 out of 57 of the island's endemics assessed as globally threatened, Sri Lanka stands out at a global level regarding this sombre fact. Only 11 endemics are categorized as Least Concern, meaning they are widespread and have strong viable populations over much of their ranges. With future fieldwork, both of the 2 species assessed as Data Deficient will probably fall into one of the categories of threat. Though the 5 species in the Near Threatened category are still relatively common, their populations are likely to be affected by degradation of their habitats.

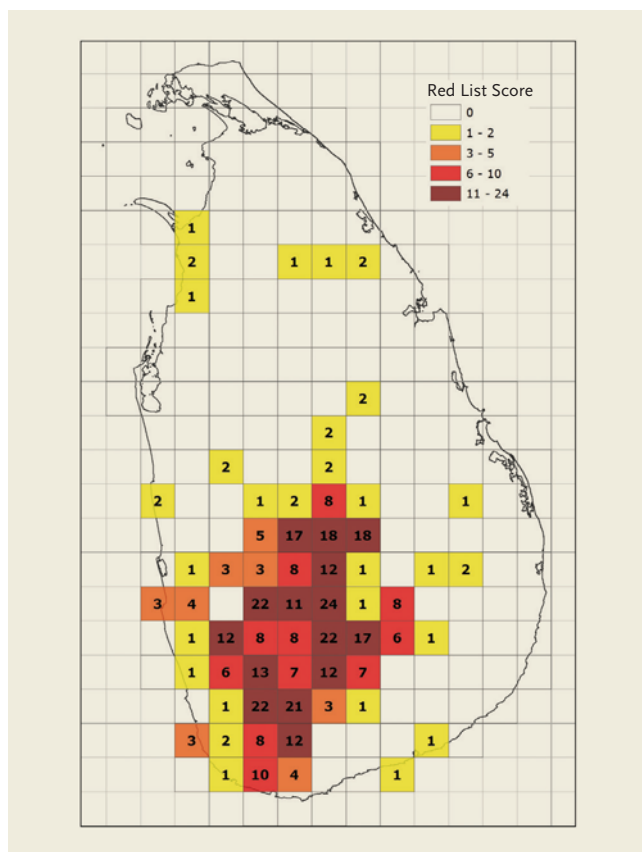
Assessment of threat status of all 57 described endemic dragonfly species and subspecies from Sri Lanka according to IUCN Categories—number and proportion of taxa in individual IUCN Red List Categories (CR – Critically Endangered, EN – Endangered, VU – Vulnerable, DD – Data Deficient, NT – Near Threatened, LC – Least Concern).

| | |
|--|---|
| EX - EXTINCT | NO SPECIES |
| CR - CRITICALLY ENDANGERED 10 spp. – 18% | <i>Sinhalestes orientalis</i> , <i>Drepanosticta adami</i> , <i>Drepanosticta subtropica</i> , <i>Elatoneura leucostigma</i> , <i>Anisogomphus ceylonicus</i> , <i>Heliogomphus lyratus</i> , <i>Heliogomphus nietneri</i> , <i>Macromia flinti</i> , <i>Hylaeothemis fruhstorferi</i> , <i>Lyriothemis defonsecai</i> |
| EN - ENDANGERED 12 spp. – 21% | <i>Libellago corbeti</i> , <i>Indolestes divisus</i> , <i>Mortonagrion ceylonicum</i> , <i>Archibasis lieftincki</i> , <i>Drepanosticta digna</i> , <i>Drepanosticta hiliaris</i> , <i>Drepanosticta mojca</i> , <i>Drepanosticta montana</i> , <i>Drepanosticta submontana</i> , <i>Drepanosticta tropica</i> , <i>Drepanosticta walli</i> , <i>Macromidia donaldi pethiyagodai</i> |
| VU - VULNERABLE 17 spp. – 30% | <i>Indolestes gracilis gracilis</i> , <i>Drepanosticta anamia</i> , <i>Drepanosticta austeni</i> , <i>Drepanosticta bine</i> , <i>Drepanosticta nietneri</i> , <i>Platysticta maculata</i> , <i>Elatoneura oculata</i> , <i>Elatoneura tenax</i> , <i>Burmagomphus pyramidalis sinuatus</i> , <i>Cyclogomphus gynostylus</i> , <i>Macrogomphus lankanensis</i> , <i>Microgomphus wijaya</i> , <i>Megalogomphus ceylonicus</i> , <i>Paragomphus campestris</i> , <i>Gomphidia pearsoni</i> , <i>Macromia zeylanica</i> , <i>Tetrathemis yerburii</i> |
| DD – DATA DEFICIENT 2 spp. – 3% | <i>Archibasis oscillans hanwellanensis</i> , <i>Macrogomphus annulatus keiseri</i> |
| NT – NEAR THREATENED 5 spp. – 9% | <i>Libellago finalis</i> , <i>Platysticta apicalis</i> , <i>Elatoneura caesia</i> , <i>Heliogomphus walli</i> , <i>Paragomphus henryi</i> |
| LC – LEAST CONCERN 11 spp. – 19% | <i>Vestalis apicalis nigrescens</i> , <i>Libellago adami</i> , <i>Libellago greeni</i> , <i>Euphaea splendens</i> , <i>Pseudagrion rubriceps ceylonicum</i> , <i>Drepanosticta brincki</i> , <i>Drepanosticta lankanensis</i> , <i>Elatoneura centralis</i> , <i>Prodasineura sita</i> , <i>Epophthalmia vittata cyanocephala</i> , <i>Zygonyx iris ceylonicus</i> |

Most of the island's endemics that are globally threatened are restricted in their range and their known occurrence is limited almost exclusively to a few isolated localities in the wet and intermediate zones of Sri Lanka. These facts are alarming and definitely have global importance from the point of view of biodiversity conservation.

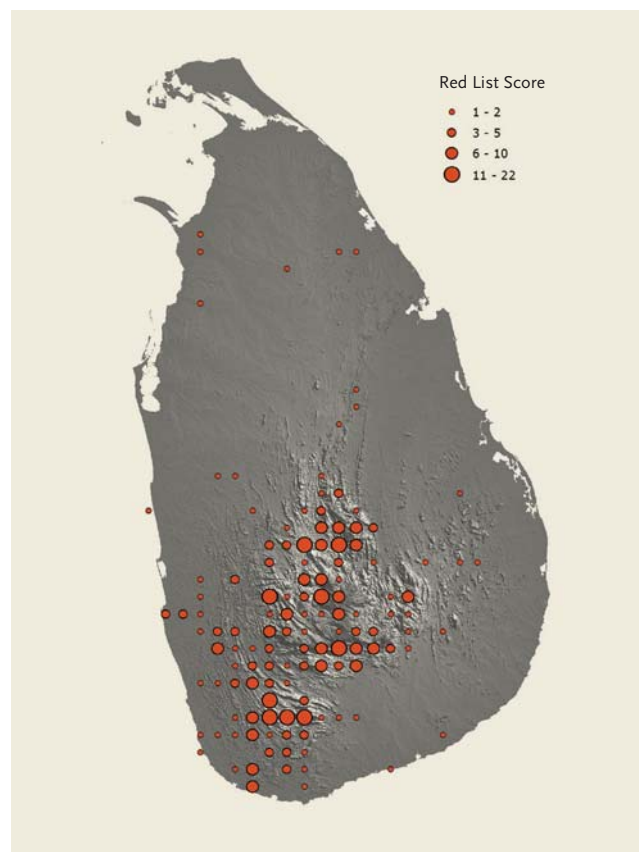
In order to present this occurrence of threatened taxa in a condensed, graphical format, a Red List Score has been calculated for each square of the 20x20 and 10x10 kilometre UTM grid set over Sri Lanka. The Red List Score has been calculated by adding together assigned points for all threatened

species for each individual square, whereby Critically Endangered species were given 3 points, Endangered 2 points and Vulnerable 1 point. From the numbers and colour of the squares at a larger scale as well as from the size of the dots at a finer scale on the figures below, it is evident where the occurrences of threatened species are more concentrated and where the conservation attention should be directed first. From a global perspective, the extremely small area in central and southwestern Sri Lanka is crucial for the future survival and existence of the majority of dragonfly endemics confined to the island.



Map of Sri Lanka with 20x20-kilometre grid and indicated Red List Score. The number and the colour of the square represent the weighted sum of the occurrence of threatened dragonfly species, whereby Critically Endangered species were given 3 points, Endangered 2 points and Vulnerable 1 point.

Another summarization of threatened species' occurrence is the joint distribution maps for individual categories of threat presented below. For the 17 species assessed as Vulnerable there are

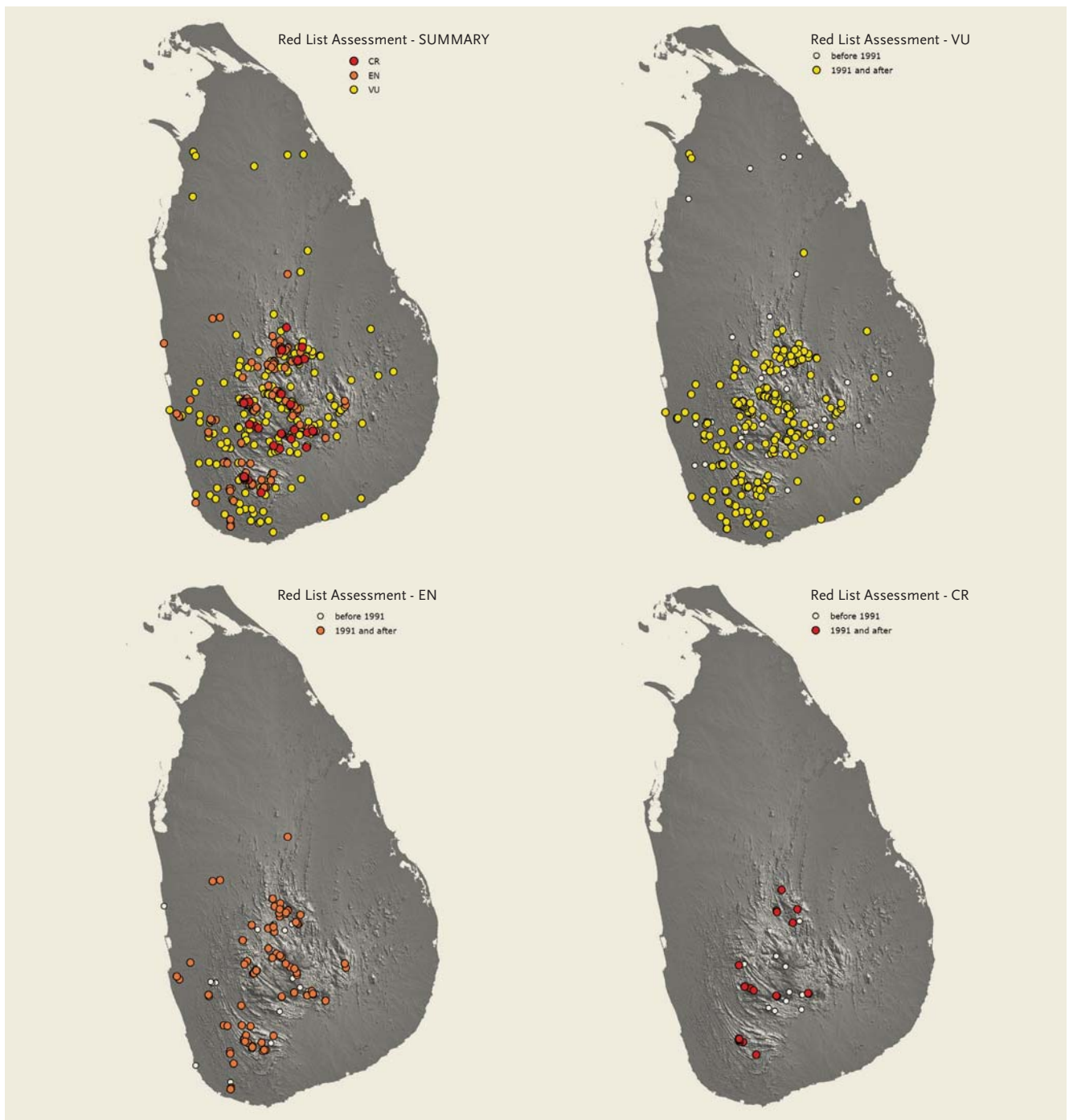


Map of Sri Lanka with indicated Red List Score on a 10x10-kilometre grid. The size of the dot represents the weighted sum of the occurrence of threatened dragonfly species in an individual square, whereby Critically Endangered species were given 3 points, Endangered 2 points and Vulnerable 1 point.

altogether 336 localities known with a total of 616 faunistic records. For the 12 species assessed as Endangered, the total number of known localities is 113 with only 163 faunistic records. For the 10

Critically Endangered species, the known localities and records are even scarcer. They have been recorded at only 37 localities with only 77 faunistic records

in the entire 160-year history of odonatological exploration of the island's dragonfly fauna.



Occurrence of threatened endemic dragonfly species in Sri Lanka as per assessments presented in this publication. Summary map with the records of all threatened species is presented top left, whereby the records of Critically Endangered, Endangered and Vulnerable species are marked with red, orange and yellow dots, respectively. The three additional maps represent separately the localities of threatened species in individual IUCN categories, whereby the records of Critically Endangered, Endangered and Vulnerable species collected after 1990 are marked with red, orange and yellow dots, respectively. In all maps, records originating from 1990 or earlier are marked with white dots.

The worrying threat status of the island's remarkable endemic dragonfly fauna calls for immediate action. The current knowledge, although very far from being complete, enables a focused and feasible research and conservation approach and forms a solid base for future projects. Priorities

and recommendations are given in CHAPTER 8 and CHAPTER 9. They represent the authors' well-intentioned appeals to change the past trends and to make steps to improve the odds of long-term survival for the island's threatened endemic dragonfly species.

Chapter 8

CONSERVATION PRIORITIES AND RECOMMENDATIONS

Throughout the book, the conservation status of individual dragonfly species and their habitats has been highlighted. Unfortunately, many species are affected by multiple threats, some to the extent that their long-term survival is highly questionable. As stated in CHAPTER 2, the destruction of habitats remains the most serious menace to the long-term survival of the island's remarkable dragonfly fauna. For the successful conservation of dragonflies, it is crucial to maintain the structural integrity of the habitats of both the larvae and adults—not only is the water environment important, but the surrounding terrestrial environment as well. Species conservation requires the conservation of the remaining natural habitats and the restoration of already degraded sites in key areas.

Each threatened dragonfly species has different biological and ecological needs. Most are found near running water including small trickles, rivulets, streams, and rivers that flow through forests or that are surrounded by at least a belt of natural vegetation. The great majority of such habitats, and consequently many threatened dragonfly species, are found only in the central and southwestern parts of the island. The ongoing pressures on such natural environments and on the key natural water resources are immense, particularly in such a small country with such a high population density. Since most of the natural habitats have been heavily disturbed and fragmented over the last 150 years, conservation efforts should focus on stopping further encroachment on the remaining forests in the central and southwestern parts of Sri Lanka. It is of utmost importance to establish effective measures for nature conservation in declared protected areas

in this part of the island, as well as to establish new protected areas and corridors. Only such an interconnecting ecological network can ensure the long-term preservation of the endemic fauna and flora of Sri Lanka, including dragonflies. However, it is also important not to overlook the role of secondary forests or “novel ecosystems”. These habitats can also play a significant role in maintaining populations of several threatened dragonfly species, similar to what was shown for mammals, reptiles and amphibians by PETHIYAGODA (2012), and they also greatly enrich the landscape mosaic. Dragonfly habitats are also usually important habitats for a great variety of other threatened freshwater organisms. Dragonfly habitats, then, encompass a broader importance, whereby the status of the dragonfly fauna can serve as a model indicator of the success of nature conservation efforts (CORBET, 1999; KALKMAN et al., 2008; CLAUSNITZER et al., 2012).

Because basic information on the biology, ecology and distribution of many threatened endemic dragonfly species is limited, it is difficult to develop conservation measures either for a “single species-oriented” program or for a local level program. Both of these conservation measures require better knowledge and further research. Although priorities and recommendations for research are given in CHAPTER 9, they apply here and have an immense interconnecting importance for the conservation of the dragonfly fauna. A crucial example is the lack of comprehensive information on the dragonfly fauna of existing protected areas in Sri Lanka—not a single in-depth field study on this topic has been published. Therefore we can only guess if and to what extent the existing protected areas are really ensuring the

long-term conservation and survival of threatened dragonfly fauna.

Insect conservation in general often has to struggle with a lack of detailed information, and dragonflies are no exception. This has been pointed out several times for the dragonfly fauna of Sri Lanka by BEDJANIĆ (2004, 2006b) and VAN DER POORTEN & CONNIFF (2012), who have suggested priority measures to be taken. However, the conservation situation for dragonflies has been included and formally declared in three Red Lists of threatened dragonfly species prepared since the dawn of the millennium (2000, 2007, 2012). The latest publication—*The National Red List 2012 of Sri Lanka* by the Ministry of Environment—listed over 60 dragonfly species as threatened on the regional level according to IUCN criteria and categories (VAN DER POORTEN & CONNIFF, 2012). On the global level, 20 species were assessed by BEDJANIĆ (2006a, 2009b) and are officially listed as globally threatened on the IUCN Red List of Threatened Species. As a further step, the global assessments of the threat status of all endemic species and subspecies according to IUCN criteria are presented in this publication and summarized in CHAPTER 7. Last but not least, since 2009, the legal protection of all dragonfly species, regardless of their threat status, has been granted according to Schedule VII of the *Fauna and Flora Protection (Amendment) Act, No. 22 of 2009*.

So far only VAN DER POORTEN & CONNIFF (2012) took a step further and listed some examples of threats to individual odonatologically important areas and suggested conservation measures which would need to be taken to improve the conservation status of species and habitats. Here, a more general approach is taken and the conservation priorities and recommendations are summarized below.

Conservation priorities and recommendations:

- Enforce and supplement existing conservation measures in protected areas. In many cases the protective legislation doesn't stop the gross destruction of the habitat with the consequent loss of species. Agricultural expansion in forest areas slowly but consistently encroaches important areas by the cutting of undergrowth and small-scale logging. When vegetation is removed or damaged around streams and seeps, there are negative effects on many dragonfly species.
- Establish new protected areas in the central and southwestern part of Sri Lanka and enlarge existing ones. Several patches of rainforests or partly degraded areas with exceptionally rich fauna and flora are excluded from the current protected area network. The conservation focus should be on the wet zone and montane areas where the majority of the island's endemics are found. Our data clearly shows that only a small proportion of threatened endemic dragonfly taxa inhabit dry zone lowland rivers and water tanks.
- Enforce existing legislation and legislate additional protection for the smallest streams, rivulets and forest corridors in the wet zone. Streams, rivulets and forest corridors need legislation to prohibit the diversion of streams and clear-cutting from the edges since this destroys the dragonfly habitats. Buffer zones of natural vegetation, especially around swamps and flowing waters, should be mandatory by legislation.
- Enforce measures to avoid siltation and unnatural flow regimes of running waters. Damming streams or piping springs should be minimized, especially in key dragonfly conservation areas. Water extraction for consumption and irrigation should be sustainable, taking into account the integrity of the habitat and its biodiversity.
- Minimize the chemical and organic pollution of water habitats. The impact of the over-use of various agricultural chemicals and insecticides in Sri Lanka is virtually unknown, but surely has a strong negative impact on species, including humans.
- Restore degraded areas in key locations. The natural potential for restoration is very high in partly degraded habitats, and a favourable conservation status can be restored in a relatively short time with simple measures.

- Conduct comprehensive odonatological faunistic work in protected areas of the central and south-western part of the island, including regular monitoring as a subsequent step. The amount of much needed new knowledge gathered in this way would be immense. Without this baseline information, specific conservation guidelines are hard to elaborate and effective conservation measures on the local level cannot be undertaken.
- Raise awareness on the threat status of the endemic dragonfly fauna of Sri Lanka among local scientists, students, nature tour guides and naturalists, as well as relevant nature conservation authorities and organisations, both locally and internationally.

Chapter 9

RESEARCH PRIORITIES AND RECOMMENDATIONS

The main objective of the present publication is to summarize the current knowledge on the distribution, taxonomy and biology of the dragonflies of Sri Lanka. Though this publication brings together a substantial amount of valuable old and new information on the dragonfly fauna of the island, our knowledge is still fragmentary in many respects. Therefore, throughout the book attempts have been made to point out the gaps in this knowledge, and it is important that field activities and surveys continue in order to advance odonatology in Sri Lanka, both from a scientific and a conservation point of view.

The odonatological research priorities and recommendations presented below have been previously articulated by BEDJANIĆ (2004, 2006b) and VAN DER POORTEN & CONNIFF (2012), but we now have a fuller understanding of the deficiencies and gaps. Hopefully, future odonatological research and conservation projects will find the much needed support from the relevant authorities and organizations in Sri Lanka and abroad.

Prioritized list of recommendations for research:

- Comprehensive odonatological faunistic mapping of the whole island. As it is clearly pointed out and evident from the introductory overview figures in CHAPTER 6 and also from the overview table in APPENDIX I, there are still large areas of the island which have been very poorly covered odonatologically in the past. Research should be directed to those regions for which we have only very old or fragmented faunistic data and particularly to the regions that are shown as complete “white spots”, from which we have no data.
- Targeted faunistic mapping of the endangered and less widespread endemic dragonfly species. On the basis of the hereto available knowledge on species’ distribution and biology it is partly possible to predict the potential habitats and distribution of selected species. This should be checked with targeted fieldwork in selected areas and seasons.
- Targeted odonatological faunistic mapping of protected areas and other important yet unprotected areas in the wet and intermediate zone of Sri Lanka where most of the endemic species have been found to date. The dragonfly fauna of most of the smaller protected areas scattered in the central and southwestern part of the island is unknown and it is crucial to get an overview of the importance of these areas for the conservation of threatened endemic species.
- Description of the larval forms and exuviae of those species that have not yet been described. In particular, those of the endemic representatives of the families Gomphidae and Corduliidae are a priority. Knowledge of larval forms and exuviae will greatly enhance the faunistic fieldwork by larval sampling.
- Complete descriptions of the adults of both males and females including variation with priority

given to those species for which full descriptions are not available.

- Preparation of a comprehensive key for the identification of the adult dragonflies of the island.
- Further research on the taxonomy and phylogeny of the exclusively endemic family Platystictidae with its remarkable species radiation.
- Research on the biology of the endangered species to evaluate population size, viability and prospects for their long-term survival.

Other recommendations:

- On going updates to the existing databases on the distribution of dragonflies of Sri Lanka. This will allow researchers to elaborate up-to-date overviews of current knowledge on each species and generate outputs such as distribution maps, seasonal phenology and altitudinal distribution charts.
- Training in all aspects of odonatological research including the identification of odonates for local scientists, students and interested amateurs including nature tour guides and naturalists.
- Fund and facilitate dragonfly research at the level of M.Sc. and Ph.D.
- Build up and maintain a central dragonfly collection in the Colombo National Museum for research and educational purposes.
- Develop and maintain links between experts involved in the studies of the dragonfly fauna of the island and research and nature conservation institutions both within and outside Sri Lanka. Prepare a list of joint research and conservation project proposals.
- Facilitate research by providing logistical and administrative support by the relevant Sri Lankan government agencies.

Last but not least, an important final remark, closely connected to research, should be made in the respect of dragonfly collecting. Almost all of the historical data and knowledge on the dragonfly fauna of Sri Lanka until the break of the millennium derived from collections made by amateurs as well as professional scientists. Even though some collections were made unselectively by general entomologists or amateurs who were not specialised in dragonfly research, the act of collecting specimens has not been responsible for the decline in population sizes or distribution of any of the endemic species. This holds true not only for Sri Lanka, but globally—the decline in populations and contraction of distribution are a result of the loss and degradation of habitats.

In addition, since dragonflies lose all their beautiful colours post-mortem, they are not of commercial interest for “collectors” in the sense of “entomological resale”—there is no market for dragonflies. Further, specimens of dragonflies do not play any role in pharmaceutical or medicinal prospecting. Therefore, scientific collecting of dragonflies for the purpose of taxonomic and faunistic research is not problematic from an economic or nature conservation perspective.

Although appropriate photographic equipment for documentary purposes is now widely available, serious odonatological faunistic work and scientific research usually require the selective capture of voucher material. In some cases, photographic records are accepted as secondary vouchers, for example, to document the presence of a known species in a particular area (KAGEYAMA et al., 2006). However, for the primary identification of a species, particularly one that is suspected to be new to science, a primary voucher is necessary. The specimen must be collected in order to be able to carefully study it and to have a permanent record. These primary vouchers must be handled according to accepted international protocols and deposited in a recognized institution for future research.

Particularly with regard to threatened species, the publication, *Guidelines on the Implementation of the “IUCN Policy Statement on Research Involving Species at Risk of Extinction”, with special reference to Scientific Collecting of Threatened Species* (IUCN, 2011), outlines measures for research.

The main points are as follows:

- Research and threatened species: Governments and research institutions should encourage and facilitate research on globally threatened species by competent scientists.
- Legislative procedures: Blanket prohibitions on research and collecting often hinder conservation efforts. Agencies are encouraged to facilitate the issuing of permits without sacrificing scientific standards.
- Non-lethal collecting: Governments are encouraged to minimize the administrative requirements for non-lethal collecting which provides useful research material.
- Responsible collecting: Scientists should act responsibly to ensure their research will assist in the conservation of the species.

- Small populations: Scientists must ensure that any lethal collecting does not increase the risk of extinction for the species. In the case of very small populations lethal collecting is not advisable.
- CITES: When scientific collecting of threatened species involves the movement across international borders, the provisions of CITES should be followed.

The main message derived from this document is a clear need for basic and applied research on threatened species that contributes to the likelihood of their survival. Governments and research institutions should encourage and facilitate research on globally threatened species by competent scientists to enhance understanding of the natural history and conservation needs of these species (IUCN, 2011).

Sri Lanka has a rich history of collaboration with international experts and institutions, which has also partly contributed to the state of knowledge of its dragonfly fauna today. However, more research is still urgently required as are measures to stop habitat loss and fragmentation.



Chapter 10

ODONATOLOGICAL BIBLIOGRAPHY OF SRI LANKA

This chapter gathers together the complete bibliography of all titles on the dragonflies of Sri Lanka, published in the last 160 years. It all started with the description of the beautiful endemic *Euphaea splendens* by H. A. Hagen in the famous publication of baron M. E. de Selys-Longchamps—*Synopsis des Caloptérygines* back in 1853 (HAGEN in SELYS, 1853). The list continues till the year 2013, with some of the listed articles published almost simultaneously with the present book.

Altogether, over 330 titles are cited in this chapter and were used in various ways in the course of the preparation of this book. Out of this, over 260

entries are printed bold as they contain at least one faunistic record or any other data on the dragonflies of the island and thus represent the odonatological bibliography of Sri Lanka for the period 1853–2013.

Hopefully, having all these pieces of information gathered now in one place will help young researchers to build relevant knowledge based on all available old and newer information and to publish their findings in the many journals now available in Sri Lanka and abroad. The evergreen Latin saying “*Litera scripta manet*”—the written letter remains—is nowadays even more important, also in odontology.

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Appendix 1

OVERVIEW OF DRAGONFLY SPECIES PER DISTRICT AND PROVINCE

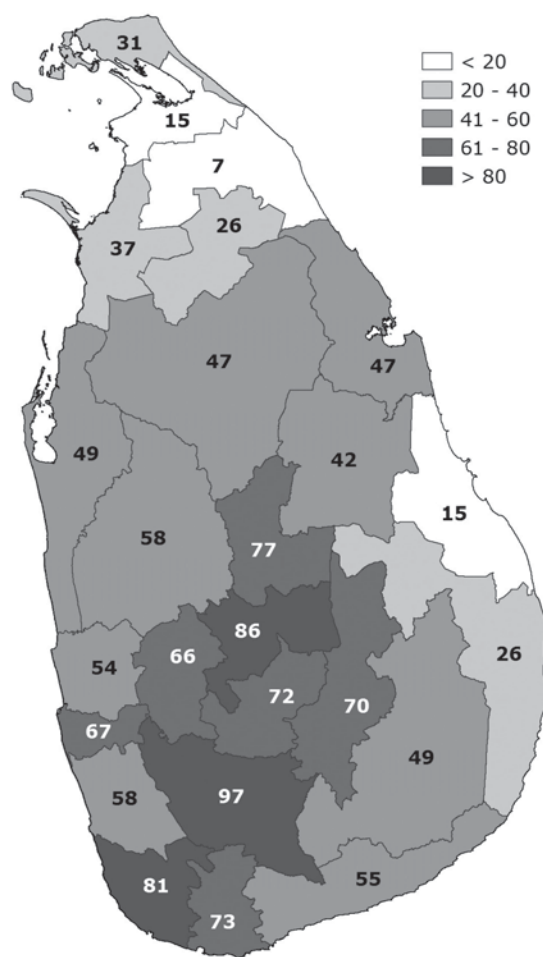
A list of species in a particular geographical or politically-defined entity such as a country, province or district is a common way to present condensed information of research results or the research state of a particular area. In Sri Lanka, with the exception of a preliminary report on the dragonflies of the Northern Province (VAN DER POORTEN, 2011C), no comprehensive

overview of the occurrence of dragonfly species at the provincial or district level exists.

Hopefully, this overview will additionally stimulate researchers to undertake faunistic work especially in poorly researched areas. It is to be expected that many additions to the individual species' lists will be made in future years.



Map of Sri Lanka with district names and their borders indicated.



Map of Sri Lanka with number of dragonfly species recorded per district indicated.

A summary of present knowledge of the occurrence of species in each district and province. Provinces are abbreviated as follows: NORTH – Northern Province; NW – North Western Province; NC – North Central Province; CENTRAL – Central Province; WEST – Western Province; SAB – Sabaragamuwa Province; SOUTH – Southern Province; UVA – Uva Province; EAST – Eastern Province. As with the species' distribution maps in CHAPTER 6, a yellow dot indicates that there is only data collected before 1991, whereas a red dot indicates that newer data, collected in 1991 or later, are available. A summary of the total number of species recorded to date in each district and province is also given.

| | Province | NORTH | | | | | NW | NC | CENTRAL | | | WEST | | | SAB | SOUTH | | | UVA | EAST | | | | | | | |
|----|---------------------------------------|--------|-------------|--------|------------|----------|------------|----------|--------------|-------------|-------|--------|--------------|---------|---------|----------|---------|-----------|-------|------------|--------|---------|------------|--------|------------|-------------|---|
| no | District | Jaffna | Kilinochchi | Mannar | Mullaitivu | Vavuniya | Kurunegala | Puttalam | Anuradhapura | Polonnaruwa | Kandy | Matale | Nuwara Eliya | Colombo | Gampaha | Kalutara | Kegalle | Ratnapura | Galle | Hambantota | Matara | Badulla | Moneragala | Ampara | Batticaloa | Trincomalee | |
| 1 | <i>Neurobasis chinensis chinensis</i> | | | | | | ● | | ● | | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | | | | | |
| 2 | <i>Vestalis apicalis nigrescens</i> | | | | | | ● | | | ● | ● | ● | ● | | ● | ● | ● | ● | ● | | ● | ● | ● | ● | | | |
| 3 | <i>Libellago adami</i> | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | |
| 4 | <i>Libellago corbeti</i> | | | | | | | | | | | | | | | ● | | ● | ● | | | | | | | | |
| 5 | <i>Libellago finalis</i> | | | | | | | | | | ● | ● | ● | | | | ● | ● | ● | | ● | ● | | | | | |
| 6 | <i>Libellago greeni</i> | | | | | | ● | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | | ● | |
| 7 | <i>Euphaea splendens</i> | | | | | | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | | | |
| 8 | <i>Lestes elatus</i> | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | ● | | ● | ● | | | ● | |
| 9 | <i>Lestes malabaricus</i> | ● | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | <i>Lestes praemorsus decipiens</i> | | | | | | ● | ● | ● | | ● | ● | | ● | | | | ● | ● | ● | | ● | | | | ● | |
| 11 | <i>Sinhalestes orientalis</i> | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | |
| 12 | <i>Indolestes divisus</i> | | | | | | ● | | | | ● | ● | ● | | | | | | | | | ● | | | | | |
| 13 | <i>Indolestes gracilis gracilis</i> | | | | | | | | | | ● | | ● | | | | | | | | ● | ● | | | | | |
| 14 | <i>Onychargia atrocyana</i> | | | | | | ● | | ● | | ● | | | ● | ● | ● | | ● | ● | ● | ● | | | | | | |
| 15 | <i>Agriocnemis femina</i> | | | | ● | | | ● | | | ● | | | ● | | | | ● | | | | | | | | | |
| 16 | <i>Agriocnemis pygmaea</i> | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | |
| 17 | <i>Mortonagrion ceylonicum</i> | | | | | | | ● | | | | | | ● | ● | ● | | ● | ● | | | | | | | | |
| 18 | <i>Paracercion malayanum</i> | | | ● | | | ● | | | | ● | ● | ● | ● | | | | | | ● | ● | | ● | | | ● | |
| 19 | <i>Aciagrion occidentale</i> | ● | | ● | | ● | ● | ● | ● | | ● | ● | ● | ● | ● | | | ● | ● | ● | | ● | ● | ● | ● | ● | |
| 20 | <i>Ischnura aurora rubilio</i> | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● |

| | Province | NORTH | | | | | NW | NC | CENTRAL | | | WEST | | | SAB | SOUTH | | | UVA | EAST | | | | | | |
|----|--|--------|-------------|--------|------------|----------|------------|----------|--------------|-------------|-------|--------|--------------|---------|---------|----------|---------|-----------|-------|------------|--------|---------|------------|--------|------------|-------------|
| no | District | Jaffna | Kilinochchi | Mannar | Mullaitivu | Vavuniya | Kurunegala | Puttalam | Anuradhapura | Polonnaruwa | Kandy | Matale | Nuwara Eliya | Colombo | Gampaha | Kalutara | Kegalle | Ratnapura | Galle | Hambantota | Matara | Badulla | Moneragala | Ampara | Batticaloa | Trincomalee |
| 21 | <i>Ischnura senegalensis</i> | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 22 | <i>Amphiallagma parvum</i> | | | | | | | | | | ● | | | | | | | | | | | | ● | | | |
| 23 | <i>Ceriagrion cerinorubellum</i> | | | | | | ● | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | | ● |
| 24 | <i>Ceriagrion coromandelianum</i> | ● | | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● |
| 25 | <i>Pseudagrion decorum</i> | | | ● | | | | | | | | | | | | | | | | | | | | | | |
| 26 | <i>Pseudagrion malabaricum</i> | | | ● | | | ● | ● | ● | ● | ● | ● | | ● | ● | | | ● | ● | ● | ● | ● | | | ● | |
| 27 | <i>Pseudagrion microcephalum</i> | ● | | ● | | | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | ● | ● | ● | ● | | | ● | | ● |
| 28 | <i>Pseudagrion rubriceps ceylonicum</i> | ● | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● |
| 29 | <i>Archibasis lieftincki</i> | | | | | | | | | | | | | | | | | ● | | | ● | | | | | |
| 30 | <i>Archibasis oscillans hanwellanensis</i> | | | | | | | | | | | | | ● | | | | | | | | | | | | |
| 31 | <i>Copera marginipes</i> | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 32 | <i>Drepanosticta anamia</i> | | | | | | | | | | | | ● | ● | | ● | ● | ● | ● | | ● | | | | | |
| 33 | <i>Drepanosticta adami</i> | | | | | | | | | | ● | ● | | | | | | | | | | | | | | |
| 34 | <i>Drepanosticta austeni</i> | | | | | | | | | | ● | | | | | | | ● | | | | ● | | | | |
| 35 | <i>Drepanosticta bine</i> | | | | | | | | | | | | ● | | | ● | ● | ● | ● | | ● | | | | | |
| 36 | <i>Drepanosticta brincki</i> | | | | | | | | | | ● | | ● | ● | | ● | ● | ● | ● | | ● | | | | | |
| 37 | <i>Drepanosticta digna</i> | | | | | | | | | | ● | | | | | | ● | | | | | | | | | |
| 38 | <i>Drepanosticta hilaris</i> | | | | | | | | | | | | ● | | | | | ● | | | | | | | | |
| 39 | <i>Drepanosticta lankanensis</i> | | | | | | | | | | | | ● | ● | | ● | ● | ● | ● | | ● | ● | | | | |
| 40 | <i>Drepanosticta mojca</i> | | | | | | | | | | | | | | | ● | | ● | ● | | | | | | | |
| 41 | <i>Drepanosticta montana</i> | | | | | | | | | | | | ● | | | | | ● | | | | ● | | | | |

| | Province | NORTH | | | | | NW | NC | CENTRAL | | | WEST | | | SAB | SOUTH | | UVA | EAST | | | | | | | |
|----|---------------------------------|--------|-------------|--------|------------|----------|------------|----------|--------------|-------------|-------|--------|--------------|---------|---------|----------|---------|-----------|-------|------------|--------|---------|------------|--------|------------|-------------|
| no | District | Jaffna | Kilinochchi | Mannar | Mullaitivu | Vavuniya | Kurunegala | Puttalam | Anuradhapura | Polonnaruwa | Kandy | Matale | Nuwara Eliya | Colombo | Gampaha | Kalutara | Kegalle | Ratnapura | Galle | Hambantota | Matara | Badulla | Moneragala | Ampara | Batticaloa | Trincomalee |
| 42 | <i>Drepanosticta nietneri</i> | | | | | | | | | | ● | | | | | ● | ● | ● | ● | | ● | ● | | | | |
| 43 | <i>Drepanosticta submontana</i> | | | | | | | | | | ● | ● | | | | | | | | | | | | | | |
| 44 | <i>Drepanosticta subtropica</i> | | | | | | | | | | | | | | | | | ● | | | | | | | | |
| 45 | <i>Drepanosticta tropica</i> | | | | | | | | | | | | ● | | | | ● | ● | | | | ● | | | | |
| 46 | <i>Drepanosticta walli</i> | | | | | | | | | | ● | ● | | ● | | | ● | | | | | | | | | |
| 47 | <i>Drepanosticta</i> sp. nov. A | | | | | | | | | | | | ● | | | | ● | ● | | | | | | | | |
| 48 | <i>Drepanosticta</i> sp. nov. B | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| 49 | <i>Platysticta apicalis</i> | | | | | | | | | | ● | ● | ● | | | ● | ● | ● | ● | | ● | ● | | | | |
| 50 | <i>Platysticta maculata</i> | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | |
| 51 | <i>Platysticta</i> sp. nov. A | | | | | | | | | | ● | ● | ● | ● | | ● | ● | ● | ● | | ● | | | | | |
| 52 | <i>Platysticta</i> sp. nov. B | | | | | | | | | | ● | ● | | | | | | ● | ● | | | ● | ● | | | |
| 53 | <i>Elattonneura caesia</i> | | | | | | | | | | ● | ● | ● | | ● | ● | ● | ● | ● | | ● | ● | | | | |
| 54 | <i>Elattonneura centralis</i> | | | | | | | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | |
| 55 | <i>Elattonneura leucostigma</i> | | | | | | | | | | | | ● | | | | | | | | | ● | | | | |
| 56 | <i>Elattonneura oculata</i> | | | | | | | | | | | | | ● | | ● | ● | ● | ● | | ● | | | | | |
| 57 | <i>Elattonneura tenax</i> | | | | | | | | | | ● | ● | ● | | | | ● | ● | ● | | ● | ● | | | | |
| 58 | <i>Prodasineura sita</i> | | | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | ● |
| 59 | <i>Anaciaeschna donaldi</i> | | | | | | | | | | | | ● | | | | | | | | | ● | | | | |
| 60 | <i>Anax ephippiger</i> | | | | | | | | | | | | | | | | | | | ● | | | | | | ● |
| 61 | <i>Anax guttatus</i> | ● | | ● | | | ● | ● | | | | | | ● | ● | | | ● | ● | | | ● | | ● | | |
| 62 | <i>Anax immaculifrons</i> | | | | | | | | | | ● | ● | ● | | | | | ● | ● | ● | ● | ● | | | | |
| 63 | <i>Anax indicus</i> | ● | ● | ● | | | ● | | ● | ● | ● | ● | ● | | | | | | ● | ● | | ● | | | | ● |
| 64 | <i>Anax tristis</i> | | | | | | | | | | | | | ● | | | | | | | | | | | | |
| 65 | <i>Gynacantha dravida</i> | | | | | | ● | ● | | | | | | ● | ● | | ● | | ● | | ● | ● | | | | |

| | Province | NORTH | | | | | NW | NC | CENTRAL | | | WEST | | | SAB | SOUTH | | | UVA | EAST | | | | | | |
|----|--|--------|-------------|--------|------------|----------|------------|----------|--------------|-------------|-------|--------|--------------|---------|---------|----------|---------|-----------|-------|------------|--------|---------|------------|--------|------------|-------------|
| no | District | Jaffna | Kilinochchi | Mannar | Mullaitivu | Vavuniya | Kurunegala | Puttalam | Anuradhapura | Polonnaruwa | Kandy | Matale | Nuwara Eliya | Colombo | Gampaha | Kalutara | Kegalle | Ratnapura | Galle | Hambantota | Matara | Badulla | Moneragala | Ampara | Batticaloa | Trincomalee |
| 66 | <i>Anisogomphus ceylonicus</i> | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| 67 | <i>Burmagomphus pyramidalis sinuatus</i> | | | | | | | | | | ● | ● | | | | | ● | ● | | | ● | ● | | | | |
| 68 | <i>Cyclogomphus gynostylus</i> | | | ● | | | ● | | ● | | ● | | | ● | | ● | ● | | | ● | ● | | ● | | | |
| 69 | <i>Heliogomphus lyratus</i> | | | | | | | | | | | | | | | | ● | | | | ● | ● | | | | |
| 70 | <i>Heliogomphus nietneri</i> | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | | |
| 71 | <i>Heliogomphus walli</i> | | | | | | | | | | ● | ● | ● | | ● | ● | ● | ● | ● | | ● | ● | ● | | | |
| 72 | <i>Macrogomphus annulatus keiseri</i> | | | | | | | | | | ● | ● | | | | | | | | | | | | | | |
| 73 | <i>Macrogomphus lankanensis</i> | | | ● | | ● | | | ● | | ● | | | ● | | | ● | ● | ● | ● | ● | | | | | |
| 74 | <i>Microgomphus wijaya</i> | | | | | | | | | | ● | ● | | | | ● | ● | ● | ● | | ● | ● | | | | |
| 75 | <i>Megalogomphus ceylonicus</i> | | | | | | | | | | ● | ● | | ● | | ● | ● | ● | ● | | ● | ● | ● | | | |
| 76 | <i>Paragomphus henryi</i> | | | | | | | | | | ● | ● | ● | | | | ● | ● | | | ● | ● | | | | |
| 77 | <i>Paragomphus campestris</i> | | | | | | | ● | | ● | | | | | | | ● | | | | | ● | ● | ● | | |
| 78 | <i>Gomphidia pearsoni</i> | | | | | | | | | | ● | ● | | | | ● | ● | ● | ● | | ● | ● | ● | | | |
| 79 | <i>Ictinogomphus rapax</i> | ● | | ● | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | | ● |
| 80 | <i>Epophthalmia vittata cyanocephala</i> | | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | ● | ● | | | | | | | ● |
| 81 | <i>Macromia flinti</i> | | | | | | | | | | | | | | | | | ● | | | | | | | | |
| 82 | <i>Macromia zeylanica</i> | | | | | | | | | | ● | | ● | | | ● | ● | ● | ● | | ● | ● | ● | | | |
| 83 | <i>Macromidia donaldi pethiyagodai</i> | | | | | | | | | | | | | | | | ● | ● | ● | | | ● | | | | |
| 84 | <i>Hylaeothemis fruhstorferi</i> | | | | | | | | | | | | | | | | | ● | | | | | | | | |
| 85 | <i>Tetrathemis yerburii</i> | | | | | | | | | | ● | ● | ● | | ● | ● | ● | ● | ● | | ● | | | | | |
| 86 | <i>Brachydiplax sobrina</i> | ● | | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | ● | ● | ● | | | ● |

| | Province | NORTH | | | | | NW | NC | CENTRAL | | | WEST | | | SAB | SOUTH | | | UVA | EAST | | | | | | |
|-----|--|--------|-------------|--------|------------|----------|------------|----------|--------------|-------------|-------|--------|--------------|---------|---------|----------|---------|-----------|-------|------------|--------|---------|------------|--------|------------|-------------|
| no | District | Jaffna | Kilinochchi | Mannar | Mullaitivu | Vavuniya | Kurunegala | Puttalam | Anuradhapura | Polonnaruwa | Kandy | Matale | Nuwara Eliya | Colombo | Gampaha | Kalutara | Kegalle | Ratnapura | Galle | Hambantota | Matara | Badulla | Moneragala | Ampara | Batticaloa | Trincomalee |
| 87 | <i>Cratilla lineata calverti</i> | | | | | | | | | | ● | | | | | ● | ● | ● | | | | | | | | |
| 88 | <i>Lathrecista asiatica asiatica</i> | ● | ● | | | | ● | ● | ● | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | | ● | | | ● |
| 89 | <i>Lyriothemis defonseikai</i> | | | | | | | | | | | | | | | | | ● | | | | | | | | |
| 90 | <i>Orthetrum chrysis</i> | | | | | | | | | | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | | |
| 91 | <i>Orthetrum glaucum</i> | | | | | | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● |
| 92 | <i>Orthetrum luzonicum</i> | | | | | | ● | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| 93 | <i>Orthetrum pruinosum neglectum</i> | | | | | | ● | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● |
| 94 | <i>Orthetrum sabina sabina</i> | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 95 | <i>Orthetrum triangulare triangulare</i> | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | ● | | | | |
| 96 | <i>Potamarcha congener</i> | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | ● | ● | | ● | | ● | ● |
| 97 | <i>Acisoma panorpoides</i> | | | ● | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● |
| 98 | <i>Brachythemis contaminata</i> | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 99 | <i>Bradinopyga geminata</i> | ● | | ● | | ● | ● | ● | ● | | ● | ● | ● | ● | | | ● | ● | ● | ● | | | | ● | ● | ● |
| 100 | <i>Crocothemis servilia servilia</i> | ● | | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 101 | <i>Diplacodes nebulosa</i> | | | ● | | | ● | ● | ● | | ● | ● | ● | ● | ● | ● | | ● | ● | ● | ● | ● | ● | | ● | ● |
| 102 | <i>Diplacodes trivialis</i> | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 103 | <i>Indothemis carnatica</i> | ● | | ● | | | ● | ● | | | ● | ● | | | | | | ● | | ● | | | | | | ● |
| 104 | <i>Indothemis limbata sita</i> | | | | | | ● | ● | ● | ● | ● | ● | | | | | | ● | ● | | ● | | | | | ● |
| 105 | <i>Neurothemis intermedia intermedia</i> | | | ● | | | ● | ● | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | ● |
| 106 | <i>Neurothemis tullia tullia</i> | | | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 107 | <i>Rhodothemis rufa</i> | | | | | | ● | ● | ● | | ● | ● | | ● | ● | ● | | ● | ● | ● | ● | | | | | ● |

| | Province | NORTH | | | | | NW | | NC | | CENTRAL | | | WEST | | | SAB | | SOUTH | | | UVA | | EAST | | |
|-----|---|--------|-------------|--------|------------|----------|------------|----------|--------------|-------------|---------|--------|--------------|---------|---------|----------|---------|-----------|-------|------------|--------|---------|------------|--------|------------|-------------|
| no | District | Jaffna | Kilinochchi | Mannar | Mullaitivu | Vavuniya | Kurunegala | Puttalam | Anuradhapura | Polonnaruwa | Kandy | Matale | Nuwara Eliya | Colombo | Gampaha | Kalutara | Kegalle | Ratnapura | Galle | Hambantota | Matara | Badulla | Moneragala | Ampara | Batticaloa | Trincomalee |
| 108 | <i>Sympetrum fonscolombii</i> | | | | | | | | | | | | ● | | | | | ● | | | | ● | | | | |
| 109 | <i>Trithemis aurora</i> | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | | ● |
| 110 | <i>Trithemis festiva</i> | | | | | | ● | ● | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | ● |
| 111 | <i>Trithemis pallidinervis</i> | ● | ● | ● | | | ● | ● | ● | ● | | ● | | ● | ● | ● | | ● | ● | ● | | ● | ● | | ● | ● |
| 112 | <i>Onychothemis testacea ceylanica</i> | | | | | | | | ● | | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | ● | | ● | | |
| 113 | <i>Rhyothemis triangularis</i> | | | | | | ● | | | ● | ● | | | ● | | ● | | ● | ● | | ● | | ● | | | |
| 114 | <i>Rhyothemis variegata variegata</i> | ● | | ● | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | | | ● |
| 115 | <i>Hydrobasileus croceus</i> | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | | | | | | | | ● |
| 116 | <i>Pantala flavescens</i> | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 117 | <i>Tramea basilaris burmeisteri</i> | ● | ● | ● | | ● | ● | ● | ● | ● | | ● | ● | | | | | ● | ● | ● | ● | | ● | | | ● |
| 118 | <i>Tramea limbata</i> | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 119 | <i>Tholymis tillarga</i> | ● | | | | | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | | ● |
| 120 | <i>Zyxomma petiolatum</i> | ● | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | | ● | ● | ● | | | | | | |
| 121 | <i>Aethriamanta brevipennis brevipennis</i> | | | ● | | | ● | ● | ● | ● | | ● | | ● | ● | | | | | ● | | | | | | |
| 122 | <i>Macrodiplax cora</i> | ● | ● | ● | | | | ● | | | | | | | ● | | | | | ● | | | | ● | | ● |
| 123 | <i>Urothemis signata signata</i> | ● | | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | | ● | ● | ● | | ● | ● | | ● |
| 124 | <i>Zygonyx iris ceylonicus</i> | | | | | | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | | |
| | Total number of species per District | 31 | 15 | 37 | 7 | 26 | 58 | 49 | 47 | 42 | 86 | 77 | 72 | 67 | 54 | 58 | 66 | 97 | 81 | 55 | 73 | 70 | 49 | 26 | 15 | 47 |
| | Total number of species per Province | 46 | | | | | 63 | | 52 | | 104 | | | 82 | | | 103 | | 92 | | | 79 | | 52 | | |

Appendix 2

FAUNISTIC RECORDS OF GLOBALLY THREATENED ENDEMIC DRAGONFLY SPECIES OF SRI LANKA

Well documented and reliable faunistic data are the core basis for research and nature conservation efforts. In this respect, APPENDIX 2 brings together all known faunistic information for the globally threatened endemic dragonfly species of Sri Lanka and supplements the individual species accounts of CHAPTER 6. In addition to the 39 species assessed in the present publication as globally Critically Endangered, Endangered or Vulnerable according to IUCN Red List Criteria and Categories, the faunistic data for 2 species assessed as Data Deficient are also presented.

The dragonfly records presented here were extracted from published literature and from various unpublished sources such as museum collections, field observations and photographs. Eight hundred and seventy-four faunistic records are listed, nearly 70% of which have not been previously published. With a very few exceptions, e.g. in the case of lost museum specimens from old collections, all records were checked by the authors and are considered correct and reliable.

The decision to publish full supplementary documentation for most of the endangered endemic dragonfly species of the island has been made with the aim to stimulate further research and to aid

species conservation. As clearly stated throughout the book the main threat to the dragonfly fauna of Sri Lanka is habitat loss and degradation. Increased awareness, additional fieldwork and research, that will not in any way negatively influence the survival of threatened dragonflies, will be crucial for successful conservation of species and their environments.

Hopefully, many new records of the species listed below will be made in the next few years and new information that is badly needed, on their habitats, biology and behaviour will be forthcoming. However, it is of the utmost importance that new faunistic records and observations are well documented and carefully checked before being published or added to the database.

Faunistic records for 41 endemic dragonfly species of Sri Lanka that have been assessed in the present publication as Critically Endangered, Endangered, Vulnerable or Data Deficient according to IUCN Red List Criteria and Categories. The dataset of each record comprises exact locality, district, coordinates, date, name of observer or collector, and in the case of published information, the citation of first publication.

[Individual localities of the species are marked with a bullet and ordered by districts in accordance with figure and table of APPENDIX 1. Inexact or unpublished dates are in brackets. Unpublished museum records are accompanied by the name of the institution housing the collection. Citation of literature relates to the bibliographical entries of CHAPTER 10, whereby only the original publication is listed and all secondary citations are omitted.]

Libellago corbeti

Morapitiya Forest Reserve, small stream; Kalutara Distr.; N6.5335, E80.2911; 11-iii-2010, N. & G. van der Poorten & K. Conniff: VAN DER POORTEN (2011a) ● Morapitiya; Kalutara Distr.; N6.5361, E80.2627; VAN DER POORTEN & CONNIFF (2012); 11-v-2010, K. Conniff ● Sinharaja Forest Biosphere Reserve; Ratnapura Distr.; N6.4087, E80.4447; 10-vi-2009, K. Conniff; 5-x-2009, K. Conniff; 9-x-2012, S.S. Fernando ● Sinharaja Rainforest along the main trail leading to research camp; Ratnapura Distr.; N6.4196, E80.4196; 12-x-2007, K. Conniff: VAN DER POORTEN (2011a); 13-v-2009, K. Conniff & M. Bedjanič; 27-iii-2009, N. & G. van der Poorten: VAN DER POORTEN (2011a); 5-v-2008, N. & G. van der Poorten: VAN DER POORTEN (2011a); 6-x-2008, K. Conniff: VAN DER POORTEN (2011a) ● Sinharaja, at the Kudawe entry point, 2km from the entrance gate, near the Research Station; Ratnapura Distr.; N6.4196, E80.4206; 14-xi-2008, K. Conniff & K.-D. Dijkstra: VAN DER POORTEN (2011a); 13-v-2009, K. Conniff & M. Bedjanič: VAN DER POORTEN (2011a) ● Sinharaja, near Kudawe; Ratnapura Distr.; N6.26, E80.25; 17-iv-2008, N. van der Poorten: VAN DER POORTEN (2009c); 3-vii-2007, N. van der Poorten: VAN DER POORTEN (2009c) ● Sinharaja, river below Martin's; Ratnapura Distr.; N6.4313, E80.4156; 13-v-2009, K. Conniff & M. Bedjanič: VAN DER POORTEN (2011a) ● Sinharaja, stream 500m SW of the Field Research Station in Sinharaja Forest Biosphere Reserve; N6.4175, E80.4183; 1-ii-1995, M. Bedjanič ● Sinharaja, stream near Research Station; Ratnapura Distr.; N6.4172, E80.4232; 31-i-2010, C. Hassel ● Haycock, small stream in Haycock range; Galle Distr.; N6.3253, E80.3118; 10-i-2012, S. Gunathilake ● Haycock, stream in Haycock range; Galle Distr.; N6.3335, E80.3112; 15-v-2009, M. Bedjanič: VAN DER POORTEN (2011a) ● Kanneliya Reserve, small stream near the entrance; Galle Distr.; N6.2509, E80.3381; 25-x-2007, K. Conniff & I. Lockwood: VAN DER POORTEN (2011a) ● Kottawa, Kottawa Forest Reserve; Galle Distr.; N6.1116, E80.3145; 24-iv-1892, J.W. Yerbury, NHM London: VAN DER POORTEN (2011a)

Sinhalestes orientalis

Maskeliya, small rivulet near Fishing Hut, eastern slopes of Adam's Peak; Nuwara Eliya Distr.; N6.7946, E80.5236; 31-iii-2013, N. Abayalath ● Rambodde; Nuwara Eliya Distr.; N7.0522, E80.6937; "1859", J. Nietner: HAGEN (1859) ● Adam's Peak, temple; Ratnapura Distr.; N6.8092, E80.4997; 12-xii-2012, I. Lockwood ● Bogawantalawa, stream at the road Hatton-Balangoda, at KM 27 post, Balangoda side; Ratnapura Distr.; N6.7514, E80.6989; 2-xi-2012, M. Bedjanič; 19-xii-2012, K. Conniff ● Bogawantalawa, stream in the forest S of the road pass between Hatton and Balangoda, Balangoda side; Ratnapura Distr.; N6.7558, E80.6928; 4-xi-2012, M. Bedjanič ● Thummodara, 200m NW of Thummodara in Peak Wilderness Sanctuary; Ratnapura Distr.; N6.8232, E80.4567; 17-iii-2013, A. Sumanapala: SUMANAPALA & BEDJANIČ (2013); 21-iii-2013, A. Sumanapala: SUMANAPALA & BEDJANIČ (2013) ● Thummodara, 550m NW of Thummodara in Peak Wilderness Sanctuary; Ratnapura Distr.; N6.8246, E80.455; 14-x-2012, A. Sumanapala: SUMANAPALA & BEDJANIČ (2013); 22-ii-2013, A. Sumanapala: SUMANAPALA & BEDJANIČ (2013) ● Thummodara, Peak Wilderness Sanctuary; Ratnapura Distr.; N6.8219, E80.4579; 1-ix-2012, A. Sumanapala: SUMANAPALA & BEDJANIČ (2013)

Indolestes divisus

Hammaliya Estate, on the Wariyapola-Chilaw road; Kurunegala Distr.; N7.6169, E80.1787; 16-x-2006, N. & M. van der Poorten ● Wariyapola; Kurunegala Distr.; N7.6256, E80.2338; 11-xi-2007, K. Conniff; 13-x-2008, K. Conniff ● Kandy; Kandy Distr.; N7.296, E80.6376; "May 1909", E.E. Green: LAIDLAW (1924); "May 1910", E.E. Green: LAIDLAW (1924); 3-vii-1910, E.E. Green: LAIDLAW (1924) ● Sigiriya; Matale Distr.; N7.9503, E80.7406; 13-x-2008, K. Conniff ● Sudu Oya Bridge; Matale Distr.; N7.4295, E80.6439; 10-x-2009, K. Conniff ● Sudu Oya near Matale, paddyfields; Matale Distr.; N7.4863, E80.6298; 12-x-2008, K. Conniff; 15-x-2010, K. Conniff ● Sudu Oya near Matale, paddyfields; Matale Distr.; N7.4863, E80.6298; 10-x-2009, K. Conniff ● Horton Plains National Park; Nuwara Eliya Distr.; N6.7838, E80.7909; 19-iii-1962, P. Brinck, H. Andersson & L. Cederholm: LIEFTINCK (1971a); DE SILVA WIJEYERATNE (2012b) ● Nuwara Eliya; Nuwara Eliya Distr.; N6.9738, E80.7622; DE SILVA WIJEYERATNE (2012b) ● Rambodde; Nuwara Eliya Distr.; N7.0522, E80.6937; "1858", J. Nietner: SELYS (1862) ● Hakgala; Badulla Distr.; N6.9166, E80.8116; DE SILVA WIJEYERATNE (2012b) ● Haputale, Beauvais Estate, 8km WNW of Haputale; Badulla Distr.; N6.7925, E80.8954; 3-iii-1962, P. Brinck, H. Andersson & L. Cederholm: LIEFTINCK (1971a)

Indolestes gracilis gracilis

Peradeniya Botanic Gardens; Kandy Distr.; N7.2708, E80.5934; 30-v-1975, D.H. Messersmith, G.L. Williams & P.B. Karunaratne, NMNH - Smithsonian Institution ● Pussellawa; Kandy Distr.; N7.1082, E80.6285; 6-v-1932, F.C. Fraser, NHM London ● Dalhousie, right tributary of the Seetha Gangula river 1 km downstream of the village Dalhousie; Nuwara Eliya Distr.; N6.8242, E; 23-i-1995, M.

Bedjanič: BEDJANIČ (2002) ● Galway natural reserve; Nuwara Eliya Distr.; N6.9734, E80.7913; 10-vi-1976, K.V. Krombein et al., NMNH - Smithsonian Institution; 5-iii-1972, K.V. Krombein & P.B. Karunaratne, NMNH - Smithsonian Institution ● Hakgala Botanic Gardens; Nuwara Eliya Distr.; N6.9272, E80.8069; 10-x-2008, K. Conniff; 11-x-2010, K. Conniff; 17-x-2007, D. Smallshire & K. Conniff; 19-ix-1938, M.A. Liefstinck: LIEFTINCK (1940); 21-iii-2008, S. Hettiarachchi; 24-iv-2003, M. Bedjanič; 25-x-2001, M. Bedjanič & A. Šalamun; 30-v-1975, D.H. Messersmith, G.L. Williams & P.B. Karunaratne, NMNH - Smithsonian Institution; 31-xii-2006, K. Conniff; 7-v-2006, H.-U. Kohler ● Hatton; Nuwara Eliya Distr.; N6.8952, E80.5938; 2-xi-2008, S. Abayaratne ● Hewaheta; Nuwara Eliya Distr.; N7.1078, E80.7656; 6-iii-1910, E.E. Green: LAIDLAW (1924) ● Horton Plains Ganga; Nuwara Eliya Distr.; N6.7938, E80.8004; 21-iii-1973, R. Baumann & J. Cross, NMNH - Smithsonian Institution ● Horton Plains National Park, swampy area 500m NE of the World's End; Nuwara Eliya Distr.; N6.7835, E80.7954; 26-i-1995, M. Bedjanič: BEDJANIČ (2002) ● Horton Plains National Park; Nuwara Eliya Distr.; N6.7838, E80.7909; 17-x-2006, K. Conniff; 19-iii-1962, P. Brinck, H. Andersson & L. Cederholm: LIEFTINCK (1971a); 21-iii-2008, S. Hettiarachchi; 22-iii-1973, R. Baumann & J. Cross, NMNH - Smithsonian Institution; 23-iii-2012, N. & M. van der Poorten; 23-iv-1980, Mathis W.N. et al., NMNH - Smithsonian Institution; 29-x-2001, M. Bedjanič & A. Šalamun; 8-v-2010, S. Abayaratne; DE SILVA WIJEEYERATNE (2012b); 16-x-2007, D. Smallshire & K. Conniff ● Horton Plains, Arrenga Pool, km 24/2; Nuwara Eliya Distr.; N6.851, E80.8168; 31-iii-2008, N. & M. van der Poorten; 23-iii-2012, N. & M. van der Poorten ● Kande Ela near Nuwara Eliya; Nuwara Eliya Distr.; N6.8884, E80.7799; 31-v-1976, K.V. Krombein et al., NMNH - Smithsonian Institution; 2-vi-1975, S.L. Wood & J.L. Petty, NMNH - Smithsonian Institution ● Katumana, 4.8km SE of Nuwara Eliya; Nuwara Eliya Distr.; N6.9432, E80.7988; 21-iii-1962, P. Brinck, H. Andersson & L. Cederholm: LIEFTINCK (1971a) ● Maskeliya; Nuwara Eliya Distr.; N6.8423, E80.5788; 4-iv-1901, E.E. Green: LAIDLAW (1924) ● Meepitimana, swampy area near roadside; Nuwara Eliya Distr.; N6.9019, E80.7957; 15-iii-1973, R. Baumann & J. Cross, NMNH - Smithsonian Institution ● Nanu Oya; Nuwara Eliya Distr.; N6.941, E80.7364; 20-ix-1953, F. Keiser, NHM Basel: LIEFTINCK (1955) ● Nuwara Eliya, "Wetland Reserve" of St. Andrews Hotel; Nuwara Eliya Distr.; N6.9764, E80.7603; 21-iv-2003, M. Bedjanič ● Nuwara Eliya, "Wetland Reserve" of St. Andrews Hotel; Nuwara Eliya Distr.; N6.9764, E80.7603; 18-vi-2009, G. de Silva Wijeyeratne ● Nuwara Eliya, ditch along the Lady McCalahan road in Nuwara Eliya; Nuwara Eliya Distr.; N6.9663, E80.7763; 22-iv-2003, M. Bedjanič ● Nuwara Eliya, Galway's Land; Nuwara Eliya Distr.; N6.9724, E80.7844; 28-v-1975, D.H. Messersmith, G.L. Williams & P.B. Karunaratne, NMNH - Smithsonian Institution ● Nuwara Eliya, golf course; Nuwara Eliya Distr.; N6.9708, E80.7638; 22-iv-2003, M. Bedjanič ● Nuwara Eliya, Lovers Leap Falls & Cr. near Nuwara Eliya; Nuwara Eliya Distr.; N6.9815, E80.7851; 15-iii-1973, R. Baumann & J. Cross, NMNH - Smithsonian Institution ● Nuwara Eliya, mire on Lower's Leap Sanctuary in Pidurutagala Mt. Range; Nuwara Eliya Distr.; N6.9818, E80.7867; 22-iv-2003, M. Bedjanič ● Nuwara Eliya, Moon plains Nature Reserve; Nuwara Eliya Distr.; N6.9627, E80.792; 16-iii-1973, R. Baumann & J. Cross, NMNH - Smithsonian Institution ● Nuwara Eliya, Mt. Pidurutalagala; Nuwara Eliya Distr.; N6.9996, E80.7748; 9-x-1976, G.F. Hevel, R.E. Dietz, S. Karunaratne & D.W. Balasooriya, NMNH - Smithsonian Institution ● Nuwara Eliya, One Tree Hill; Nuwara Eliya Distr.; N6.9568, E80.7598; 21-ix-1953, F. Keiser, NHM Basel; 1-vi-1953, F. Keiser, NHM Basel ● Nuwara Eliya, pond-like lakes and marshes near Nuwara Eliya; Nuwara Eliya Distr.; N6.9574, E80.7716; 19-ix-1938, M.A. Liefstinck: LIEFTINCK (1940) ● Nuwara Eliya, Race track; Nuwara Eliya Distr.; N6.9667, E80.7686; 1-iv-2008, N. & M. van der Poorten ● Nuwara Eliya, small mountain wetland on the lower slope of Pidurutagala Mts.; Nuwara Eliya Distr.; N6.9907, E80.7694; 21-iv-2003, M. Bedjanič ● Nuwara Eliya, St. Gregory's Lake and Elephant Nook wetland near Nuwara Eliya; Nuwara Eliya Distr.; N6.9538, E80.7813; 21-iv-2003, M. Bedjanič; 11-viii-1984, G. von Rosen, ZSM Munich; 16-iii-1973, R. Baumann & J. Cross, NMNH - Smithsonian Institution ● Nuwara Eliya, Victoria Park; Nuwara Eliya Distr.; N6.9641, E80.7714; 20-iii-2008, S. Hettiarachchi; 8-x-2009, K. Conniff; 21-iv-2003, M. Bedjanič; 8-x-2008, K. Conniff; 6-vi-2007, N. & M. van der Poorten; 15-x-2007, D. Smallshire & K. Conniff; 12-x-2010, K. Conniff ● Nuwara Eliya; Nuwara Eliya Distr.; N6.9738, E80.7622; "1953", F. Keiser: LIEFTINCK (1955); 9-x-1976, G.F. Hevel, R.E. Dietz, S. Karunaratne & D.W. Balasooriya, NMNH - Smithsonian Institution; 28-v-1953, F. Keiser, NHM Basel; 25-i-2012, G. Thoburns; 10-iv-2007, R. Somaweera ● Pattipola, entrance to Horton Plains National Park; Nuwara Eliya Distr.; N6.8691, E80.7669; 25-ii-2008, N. Weerasinghe et al.; 31-iii-2008, N. & M. van der Poorten ● Pattipola; Nuwara Eliya Distr.; N6.8728, E80.7722; "March 1924", FONSEKA (2000); 23-iii-2012, N. & M. van der Poorten ● Pattipola, pond at the road to Horton Plains 2km SSW of Pattipola; Nuwara Eliya Distr.; N6.8501, E80.8154; 23-iii-2012, N. & M. van der Poorten ● Pundaluoya; Nuwara Eliya Distr.; N7.0101, E80.675; E.E. Green: KIRBY (1891) ● Rambodde; Nuwara Eliya Distr.; N7.0522, E80.6937; "1858", J. Nietner: HAGEN (1858) ● Two streams at the outskirts of Nuwara Eliya, direction Rambodde; Nuwara Eliya Distr.; N6.9789, E80.7498; 23-iv-2003, M. Bedjanič ● Deniyaya; Matara Distr.; N6.344, E80.5626; 19-x-1976, G.F. Hevel, R.E. Dietz, S. Karunaratne & D.W. Balasooriya, NMNH - Smithsonian Institution; 8-x-1975, D.M. Davies, S. Karunaratne & D.W. Balasooriya, NMNH - Smithsonian Institution ● Ambawela, Warwick Gardens; Badulla Distr.; N6.9147, E80.7902; 25-xii-2007, N. & M. van der Poorten ● Bandarawella; Badulla Distr.; N6.8315, E80.9814; "October 1929", F. Wall, NHM London: FRASER (1933a) ● Diyatalawa; Badulla Distr.; N6.8154, E80.9411; 12-vi-1932, F.C. Fraser, NHM London ● Guruthalawa, small stream at the road Boralanda-Nuwara Eliya in village Guruthalawa; Badulla Distr.; N6.8441, E80.8991; 19-v-2009, M. Bedjanič ● Hakgala; Badulla Distr.; N6.9166, E80.8116; "August 1911", E.E. Green: LAIDLAW (1924); 29-viii-1909, E.E. Green: LAIDLAW (1924); 31-v-1953, F. Keiser, NHM Basel: LIEFTINCK (1955) ● Haputale, field by side of road B147, KM 6/7; Badulla Distr.; N6.7543, E80.9151; 10-iv-2007, N. & M. van der Poorten & K. Conniff ● Haputale, Tangemale bird sanctuary near Haputale; Badulla Distr.; N6.7695, E80.9347; 19-v-2009, M. Bedjanič ● Perawella, Uma Oya; Badulla Distr.; N6.9431, E80.8355; 17-iii-1973, R. Baumann & J. Cross, NMNH - Smithsonian Institution

Mortonagrion ceylonicum

Kadaimparu, 24km N of Negombo; Puttalam Distr.; N7.4293, E79.8154; 31-i-1962, P. Brinck, H. Andersson & L. Cederholm: LIEFTINCK (1971a) ● Colombo, Kotte swamp; Colombo Distr.; N6.8805, E79.931; 30-ix-2006, K. Conniff: CONNIF et al. (2011) ● Colombo, Kotte, Water's Edge; Colombo Distr.; N6.9027, E79.912; 1-i-2011, K. Conniff & H.M. Lankika ● Isigili Kanda, 9km SSE of Gampaha; Gampaha Distr.; N7.0058, E80.012; 3-vii-2012, D. Randula ● Bodhinagala, path to the temple; Kalutara Distr.; N6.7651, E80.1496; 30-ix-2011,

D. Randula ● Kalatuwawa Reservoir; Ratnapura Distr.; N6.8558, E80.2037; 19-ix-1970, O.S. Flint, M.A. Lieftinck unpubl. corresp. ● Ambalangoda; Galle Distr.; N6.2364, E80.0542; 1-iii-1911, E.E. Green: LAIDLAW (1924) ● Hiyare Forest Reserve; Galle Distr.; N6.0708, E80.3203; 15-viii-2009, M. Bedjanič & K. Conniff ● Hiyare Lake; Galle Distr.; N6.0586, E80.3165; 26-vi-2010, K. Conniff ● Hiyare, northeast shore of the lake; Galle Distr.; N6.0628, E80.3207; 14-vii-2007, K. Conniff: CONNIF et al. (2011); 10-vii-2008, N. van der Poorten, K. Conniff & S. Gunasinghe: CONNIF et al. (2011); 12-ii-2010, K. Conniff & S. Gunasinghe: CONNIF et al. (2011); 13-viii-2008, K. Conniff: CONNIF et al. (2011) ● Hiyare, south shore of the lake; Galle Distr.; N6.0589, E80.3154; 14-iv-2006, K. Conniff & S. Gunasinghe: CONNIF et al. (2011)

Archibasis lieftincki

Delwala, Delwala Oya in the village, 7.5km E of Kalawana; Ratnapura Distr.; N6.5317, E80.4642; 7-xi-2012, M. Bedjanič: CONNIF & BEDJANIČ (2013) ● Sinharaja, Kakuna Falls on Aranuwa Dola Rivulet in Sinharaja Forest Biosphere Reserve; Ratnapura Distr.; N6.3821, E80.4789; 4-xi-2001, M. Bedjanič & A. Šalamun: CONNIF & BEDJANIČ (2013) ● Weddagala, stream at Weddagala village; Ratnapura Distr.; N6.4628, E80.43; 14-v-2009, M. Bedjanič & K. Conniff: CONNIF & BEDJANIČ (2013) ● Deniyaya, Gin Ganga river 1km downstream of Deniyaya; Matara Distr.; N6.3525, E80.5668; 20-vii-2012, M. Bedjanič: CONNIF & BEDJANIČ (2013) ● Deniyaya, Gin Ganga River 2.5km downstream of Deniyaya village; Matara Distr.; N6.3531, E80.579; 30-iv-2003, M. Bedjanič: CONNIF & BEDJANIČ (2013); 3-xii-2004, S. Weldt: CONNIF & BEDJANIČ (2013) ● Deniyaya, Gin Ganga River 500m upstream of Deniyaya village; Matara Distr.; N6.3441, E80.555; 5-xi-2001, M. Bedjanič & A. Šalamun: CONNIF & BEDJANIČ (2013)

Archibasis oscillans hanwellanensis

Hanwella, drain and small stream at Meegahawatta wetland 1.3km S of Hanwella; Colombo Distr.; N6.897, E80.0843; 3-vi-2011, K. Conniff & H.M. Lankika: CONNIF & BEDJANIČ (2013); 6-ii-2011, K. Conniff: CONNIF & BEDJANIČ (2013); 6-iii-2011, N. van der Poorten: CONNIF & BEDJANIČ (2013)

Drepanosticta anamia

Laxapana, small stream on the road Kithulgala towards Polpitiya 6km NW of Laxapana; Nuwara Eliya Distr.; N6.9729, E80.451; 27-vii-2009, M. Bedjanič: BEDJANIČ (2010) ● Laxapana, small stream on the road Kithulgala-Laxapana 1km NW of Laxapana; Nuwara Eliya Distr.; N6.9335, E80.4773; 28-vii-2009, M. Bedjanič & K. Conniff: BEDJANIČ (2010) ● Laxapana, small stream on the road Laxapana-Norton Bridge 1km E of Laxapana; Nuwara Eliya Distr.; N6.9263, E80.4895; 28-vii-2009, M. Bedjanič & K. Conniff: BEDJANIČ (2010) ● Laxapana; Nuwara Eliya Distr.; N6.9269, E80.4823; 24-ix-1970, O.S. Flint: BEDJANIČ (2010) ● Tunmodera, near Labugama; Colombo Distr.; N6.8635, E80.1663; 19-ix-1970, O.S. Flint: BEDJANIČ (2010) ● Bodhinagala, Ingiriya Forest Reserve, about 30km SE of Colombo; Kalutara Distr.; N6.7647, E80.149; 11-v-2009, M. Bedjanič & K. Conniff: BEDJANIČ (2010); 15-vi-2008, M. Bedjanič & K. Conniff: BEDJANIČ (2010) ● Kithulgala, Makandawa rainforest; Kegalle Distr.; N6.9917, E80.4048; 10-xi-2012, M. Bedjanič ● Kithulgala, small stream in the secondary forest 1km S of the bridge near Plantation Hotel in Kithulgala; Kegalle Distr.; N6.9844, E80.4137; 21-v-2009, M. Bedjanič: BEDJANIČ (2010) ● Laxapana, 6.9km NW; Kegalle Distr.; N6.9675, E80.4384; 25-ix-1970, O.S. Flint: BEDJANIČ (2010) ● Mahabage, Ing Oya, left tributary of Ing Oya on the way from River Resort to Beliena Cave; Kegalle Distr.; N7.0082, E80.4291; 26-vii-2009, M. Bedjanič: BEDJANIČ (2010) ● Mahabage, Ing Oya, River Resort Hotel; Kegalle Distr.; N7.0118, E80.4346; 15-viii-2006, K. Conniff: BEDJANIČ (2010); 1-vii-2006, K. Conniff: BEDJANIČ (2010); 21-vi-2006, K. Conniff: BEDJANIČ (2010); 25-vii-2009, M. Bedjanič: BEDJANIČ (2010); 26-ii-2006, K. Conniff: BEDJANIČ (2010) ● Mahabage, Ing Oya, small seepage beside the road from River Resort Hotel to Beliena Cave; Kegalle Distr.; N7.0072, E80.4295; 26-vii-2009, M. Bedjanič: BEDJANIČ (2010) ● Mahabage; Kegalle Distr.; N7.0169, E80.4384; 9-vii-2010, N. & M. van der Poorten & K. Conniff ● Balutota Pass, stream at 10th bend in Balutota Pass on the road Deniyaya-Rakwana; Ratnapura Distr.; N6.4572, E80.6246; 17-v-2009, M. Bedjanič: BEDJANIČ (2010); 18-vii-2012, M. Bedjanič ● Eheliyagoda, cinnamon estate 8km SSE; Ratnapura Distr.; N6.7814, E80.2761; 8-xi-2011, K. Conniff ● Kalatuwawa Reservoir; Ratnapura Distr.; N6.8558, E80.2037; 19-ix-1970, O.S. Flint: BEDJANIČ (2010) ● Katugas Falls 2km N of Ratnapura; Ratnapura Distr.; N6.6827, E80.4124; 4-v-2003, M. Bedjanič: BEDJANIČ (2010) ● Sinharaja Forest Biosphere Reserve, at Ketilapatella Road river; Ratnapura Distr.; N6.4348, E80.4133; 4-vii-2007, N. & M. van der Poorten ● Sinharaja Forest Biosphere Reserve; Ratnapura Distr.; N6.4087, E80.4447; 7-x-2010, K. Conniff; 1-vii-2008, K. Conniff: BEDJANIČ (2010) ● Sinharaja, Mure Kale, near villagers hut; Ratnapura Distr.; N6.4316, E80.3989; 13-vi-2006, G. de Silva Wijeyeratne: BEDJANIČ (2010) ● Sinharaja, stream along the road from Martin's to the new visitors centre; Ratnapura Distr.; N6.4315, E80.4152; 14-v-2009, M. Bedjanič & K. Conniff: BEDJANIČ (2010) ● Uwella, primary forest on the road Uwella-Ratnapura, 11.5km NW of Balangoda; Ratnapura Distr.; N6.6968, E80.6059; 16-vii-2012, M. Bedjanič ● Deniyaya, stream in the forest 10km NEE of Deniyaya; Galle Distr.; N6.36, E80.46; 29-iv-2003, M. Bedjanič: BEDJANIČ (2010) ● Hiyare Lake, small tributaries to Hiyare lake on the N shore; Galle Distr.; N6.0584, E80.3199; 15-v-2009, M. Bedjanič: BEDJANIČ (2010); 21-vi-2006, K. Conniff: BEDJANIČ (2010) ● Kanneliya Reserve, small stream near the entrance; Galle Distr.; N6.2509, E80.3381; 15-v-2009, M. Bedjanič & S. Gunasinghe: BEDJANIČ (2010) ● Kanneliya, shady river along forest trail in Kanneliya Biosphere Reserve; Galle Distr.; N6.2455, E80.3544; 11-vii-2008, N. van der Poorten, K. Conniff & S. Gunasinghe: BEDJANIČ (2010); 1-vii-2007, K. Conniff: BEDJANIČ (2010) ● Sinharaja, main path from the entrance to Sinharaja Forest Biosphere Reserve to the Kakuna Falls on Aranuwa Dola Rivulet; Galle Distr.; N6.3662, E80.4755; 19-vii-2012, M. Bedjanič ● Diyadawa, stream on the road Morawaka-Diyadawa on the slopes of Diyadawa forest; Matara Distr.; N6.3122, E80.543; 16-v-2009, M. Bedjanič: BEDJANIČ (2010)

Drepanosticta adami

Hunas Falls, stream in Simpson's forest, 1.9km SSE of Hunas Falls Hotel; Kandy Distr.; N7.3842, E80.6944; 28-x-2012, M. Bedjanič ● Hunas Falls, stream in Simpson's forest, 2.1km SSE of Hunas Falls Hotel; Kandy Distr.; N7.383, E80.6964; 28-x-2012, M. Bedjanič ● Madugoda near Urugalla; Kandy Distr.; N7.3148, E80.8665; 5-v-1932, F.C. Fraser: FRASER (1933b) ● Urugalla, stream 1.2km from the village; Kandy Distr.; N7.3012, E80.8157; 23-v-2009, M. Bedjanič & K. Conniff ● Hunas Falls, Simpson's Forest; Matale Distr.; N7.3948, E80.6945; 18-x-2007, K. Conniff; 4-iv-2006, K. Conniff; 16-x-2010, K. Conniff

Drepanosticta austeni

Dabagahapitiya, two forested streams between paddy fields 8.5km NNE of Ududumbara; Kandy Distr.; N7.3881, E80.8945; 7-vii-2012, M. Bedjanič ● Huluganga, rivulet Huluganga on the road Rangalla-Kandy; Kandy Distr.; N7.4018, E80.7453; 6-vii-2012, M. Bedjanič ● Hunasgiriya, stream 3.2km NNE Hunasgiriya on the road to Loolwatta; Kandy Distr.; N7.3245, E80.8612; 7-vii-2012, M. Bedjanič ● Hunasgiriya, stream 3km NNE of Hunasgiriya on the road to Loolwatta; Kandy Distr.; N7.3227, E80.8616; 7-vii-2012, M. Bedjanič ● Loolwatta, stream 700m NE of Loolwatta near Dumbanagala Chalet; Kandy Distr.; N7.372, E80.8494; 7-vii-2012, M. Bedjanič ● Rangalla, stream in tea plantation 4km NE of Rangalla; Kandy Distr.; N7.3541, E80.7941; 6-vii-2012, M. Bedjanič ● Ududumbara, rivulet 1.3km N of Ududumbara; Kandy Distr.; N7.3291, E80.8797; 7-vii-2012, M. Bedjanič ● Urugalla, rivulet on the road Urugalla-Teldeniya, at the bridge and paddyfields; Kandy Distr.; N7.311, E80.8028; 23-v-2009, M. Bedjanič ● Urugalla, rivulet with cascades, 2km past Urugalla; Kandy Distr.; N7.3023, E80.8161; 31-vii-2009, M. Bedjanič; 6-vii-2012, M. Bedjanič ● Urugalla, stream 300m from the village; Kandy Distr.; N7.293, E80.8241; 6-vii-2012, M. Bedjanič; 23-v-2009, M. Bedjanič; 31-vii-2009, M. Bedjanič ● Urugalla, stream 500m from the village; Kandy Distr.; N7.2942, E80.8209; 31-vii-2009, M. Bedjanič ● Urugalla, stream 700m from the village, at the small shop near the road; Kandy Distr.; N7.2964, E80.819; 23-v-2009, M. Bedjanič ● Urugalla; Kandy Distr.; N7.2945, E80.7722; 24-v-2009, K. Conniff ● Belihul Oya, river below Jungle Rest guesthouse; Ratnapura Distr.; N6.7191, E80.7674; 18-vii-2012, M. Bedjanič ● Pinnawala, stream near the road Hatton-Balangoda at the Buddhist temple junction, 8.5km NNW of Balangoda; Ratnapura Distr.; N6.7236, E80.6742; 2-xi-2012, M. Bedjanič ● Suratalie waterfall at the Balangoda-Haputale road; Ratnapura Distr.; N6.745, E80.8297; 15-vii-2012, M. Bedjanič ● Suratalie waterfall at the Balangoda-Haputale road; Ratnapura Distr.; N6.745, E80.8297; 18-v-2009, M. Bedjanič ● Badulla, stream at the road Badulla - Passara 5.5km SE of Badulla; Badulla Distr.; N6.9627, E81.0964; 3-viii-2009, M. Bedjanič ● Badulla, stream at the road Badulla - Passara 5km SE of Badulla; Badulla Distr.; N6.9644, E81.0927; 3-viii-2009, M. Bedjanič ● Bambarakanda, rivulet that comes from Bambarakanda Falls at the road Haputale-Belihul Oya; Badulla Distr.; N6.7605, E80.8483; 8-iii-2011, K. Conniff ● Diyaluma Falls – up and downstream of the bridge; Badulla Distr.; N6.7201, E81.0252; 25-iv-2003, M. Bedjanič ● Diyaluma Falls, small stream in the rubber plantation and the main stream 700m S of Diyaluma Falls; Badulla Distr.; N6.7209, E81.0261; 26-x-2001, M. Bedjanič & A. Šalamun ● Passara, stream at the road 2km WSW of Passara; Badulla Distr.; N6.9318, E81.1399; 3-viii-2009, M. Bedjanič ● Passara, stream at the road Passara-Madulsima 3km NE of Passara; Badulla Distr.; N6.9547, E81.1701; 3-viii-2009, M. Bedjanič ● Passara, stream between tea plantations at the road Passara-Madulsima 4.5km NE of Passara; Badulla Distr.; N6.969, E81.1784; 3-viii-2009, M. Bedjanič ● Passara, stream on the road to Ella 2km SW of Passara; Badulla Distr.; N6.9294, E81.1409; 3-viii-2009, M. Bedjanič ● Passara, stream on the road to Ella 4km SW of Passara; Badulla Distr.; N6.913, E81.1296; 3-viii-2009, M. Bedjanič ● Passara; Badulla Distr.; N6.9306, E81.147; 20-ix-1938, M.A. Liefinck: LIEFTINCK (1940) ● Taldena, stream on the road Taldena-Badulla; Badulla Distr.; N7.0324, E81.0587; 2-viii-2009, M. Bedjanič

Drepanosticta bine

Laxapana, small stream on the road Kithulgala towards Hitigegama 5km NW of Laxapana; Nuwara Eliya Distr.; N6.9635, E80.4566; 27-vii-2009, M. Bedjanič: BEDJANIČ (2010) ● Laxapana, small stream on the road Laxapana-Norton Bridge 1km E of Laxapana; Nuwara Eliya Distr.; N6.9263, E80.4895; 28-vii-2009, M. Bedjanič & K. Conniff: BEDJANIČ (2010) ● Pundaluoya, small seep on the road to Rambodda, 2.7km NNW of Pundaluoya; Nuwara Eliya Distr.; N7.0374, E80.6576; 12-vii-2012, M. Bedjanič ● Pundaluoya, stream 1.8km NNW of Pundaluoya; Nuwara Eliya Distr.; N7.0395, E80.6588; 12-vii-2012, M. Bedjanič ● Agalawatta, malaise trap; Kalutara Distr.; N6.5411, E80.1551; 23-vii-1975, Y.M. Huang, E.L. Peyton, P.B. Karunaratne & Mahinda: BEDJANIČ (2010) ● Bodhinagala, Ingiriya Forest Reserve, about 30km SE of Colombo; Kalutara Distr.; N6.7541, E80.1538; 11-v-2009, M. Bedjanič & K. Conniff: BEDJANIČ (2010); 25-vi-2006, G. de Silva Wijeyeratne: BEDJANIČ (2010) ● Bodhinagala, path to the temple; Kalutara Distr.; N6.7651, E80.1496; 28-vi-2011, D. Randula; 25-vi-2011, D. Randula ● Kithulgala, left tributary of Kelani river in secondary forest 3km upstream of the bridge near Plantation Hotel in Kithulgala; Kegalle Distr.; N6.9739, E80.4368; 22-v-2009, M. Bedjanič: BEDJANIČ (2010) ● Kithulgala, small stream in the secondary forest 1km S of the bridge near Plantation Hotel in Kithulgala; Kegalle Distr.; N6.9844, E80.4137; 21-v-2009, M. Bedjanič: BEDJANIČ (2010) ● Kitulgala, Gonagamuwa Road At Coffee Planters Bungalow; Kegalle Distr.; N7.015, E80.3787; 9-vii-2010, N. & M. van der Poorten & K. Conniff ● Laxapana, 6.9km NW; Kegalle Distr.; N6.9675, E80.4384; 25-ix-1970, O.S. Flint: BEDJANIČ (2010) ● Mahabage; Kegalle Distr.; N7.0169, E80.4384; 15-vi-2006, K. Conniff: BEDJANIČ (2010); 1-vii-2006, K. Conniff: BEDJANIČ (2010) ● Balangoda, stream in Pettigala at budhist monastery NNW of Balangoda; Ratnapura Distr.; N6.653, E80.6717; 16-vii-2012, M. Bedjanič ● Balangoda, stream in Pettigala tea estate, 4.2km W of Balangoda; Ratnapura Distr.; N6.6531, E80.6615; 16-vii-2012, M. Bedjanič ● Kalatuwawa Reservoir; Ratnapura Distr.; N6.8558, E80.2037; 19-ix-1970, O.S. Flint: BEDJANIČ (2010) ● Opanayake, M.P. 84; Ratnapura Distr.; N6.6226, E80.655; 13-x-1970, O.S. Flint: BEDJANIČ (2010) ● Sinharaja, outflow of the pond at the Information centre in the forest; Ratnapura Distr.; N6.4333, E80.4138;

13-v-2009, M. Bedjanič: BEDJANIČ (2010) ● Sinharaja, stream along the road from Martin's to the new visitors centre; Ratnapura Distr.; N6.4315, E80.4152; 14-v-2009, M. Bedjanič & K. Conniff: BEDJANIČ (2010) ● Uwella, primary forest on the road Uwella-Ratnapura, 11.5km NW of Balangoda; Ratnapura Distr.; N6.6968, E80.6059; 16-vii-2012, M. Bedjanič; 5-xi-2012, M. Bedjanič ● Haycock, stream in Haycock area between tea plantations; Galle Distr.; N6.3422, E80.3099; 15-v-2009, M. Bedjanič & S. Gunasinghe: BEDJANIČ (2010) ● Haycock, stream in Haycock range; Galle Distr.; N6.3335, E80.3112; 15-v-2009, M. Bedjanič & S. Gunasinghe: BEDJANIČ (2010) ● Hiyare Lake, small tributaries to Hiyare lake on the N shore; Galle Distr.; N6.0584, E80.3199; 15-v-2009, M. Bedjanič & S. Gunasinghe: BEDJANIČ (2010) ● Diyadawa, stream on the road Morawaka-Diyadawa on the slopes of Diyadawa forest; Matara Distr.; N6.3122, E80.543; 16-v-2009, M. Bedjanič & S. Gunasinghe: BEDJANIČ (2010)

Drepanosticta digna

Gampola, Atabage Oya 6km out of Gampola; Kandy Distr.; N7.1141, E80.5982; 20-iv-2003, M. Bedjanič ● Kandy, small stream at the road to Digana 10.5 km S of Kandy; Kandy Distr.; N7.2375, E80.6408; 1-viii-2009, M. Bedjanič ● Peradeniya Botanic Gardens; Kandy Distr.; N7.2708, E80.5934; 22-ix-1970, O.S. Flint, NMNH - Smithsonian Institution ● Urugalla, rivulet with cascades, 2km past Urugalla; Kandy Distr.; N7.3023, E80.8161; 23-v-2009, M. Bedjanič ● Urugalla; Kandy Distr.; N7.2945, E80.7722; "May 1932", F.C. Fraser: FRASER (1933b); 18-ix-1938, M.A. Lieftinck: LIEFTINCK (1940); 18-v-1932, F.C. Fraser: LIEFTINCK (1940) ● Kithulgala, Plantation Hotel at Kelani River in Kithulgala; Kegalle Distr.; N6.9935, E80.4178; 28-vii-2009, M. Bedjanič; ● "Ceylan"; "1859", J. Nietner: SELYS (1860b);

Drepanosticta hilaris

Harangala, stream at the road Harangala-Pundaluoya, 4km SE of Kothmale Dam; Nuwara Eliya Distr.; N7.0424, E80.6271; 13-vii-2012, M. Bedjanič ● Laxapana, 4km NE; Nuwara Eliya Distr.; N6.9606, E80.4998; 26-ix-1970, O.S. Flint, NMNH - Smithsonian Institution ● Laxapana; Nuwara Eliya Distr.; N6.9269, E80.4823; 10-v-2010, K. Conniff ● Norton Bridge, stream on the road Norton Bridge-Kithulgala 3.7km NNW of Norton Bridge; Nuwara Eliya Distr.; N6.9461, E80.5116; 28-vii-2009, M. Bedjanič & K. Conniff ● Norton Bridge, B71, Adams Peak Road; Nuwara Eliya Distr.; N6.9483, E80.5062; 8-vii-2010, N. & M. van der Poorten & K. Conniff ● Rambodde Falls, at tunnel; Nuwara Eliya Distr.; N7.0489, E80.6961; 12-vii-2012, M. Bedjanič ● Rambodde, stream at the road Rambodde-Sangilipalama, 1.7km NW of Rambodda tunnel; Nuwara Eliya Distr.; N7.0613, E80.6845; 12-vii-2012, M. Bedjanič ● Rambodde; Nuwara Eliya Distr.; N7.0522, E80.6937; "1858", J. Nietner: HAGEN (1858); "May 1932", F.C. Fraser: FRASER (1933b) ● Balangoda; Ratnapura Distr.; N6.6418, E80.6814; " May 1932", FRASER (1933b) ● Rakwana, near Morningside; Ratnapura Distr.; N6.4598, E80.6366; 11-v-2010, K. Conniff ● Sinharaja, stream in Sinharaja Forest Biosphere Reserve 1km NE of Beverly Estate Lower Division; Ratnapura Distr.; N6.4088, E80.5465; 1-v-2003, M. Bedjanič

Drepanosticta mojca

Bodhinagala, Ingiriya Forest Reserve, about 30km SE of Colombo; Kalutara Distr.; N6.7541, E80.1538; 15-vi-2008, K. Conniff: BEDJANIČ (2010); 11-v-2009, M. Bedjanič: BEDJANIČ (2010) ● Enselwatte; Ratnapura Distr.; N6.4042, E80.6178; 25-v-1975, S.L. Wood & J.L. Petty: BEDJANIČ (2010) ● Sinharaja, stream in Sinharaja Forest Biosphere Reserve 1km NE of Beverly Estate Lower Division; Ratnapura Distr.; N6.4088, E80.5465; 1-v-2003, M. Bedjanič: BEDJANIČ (2010) ● Deniyaya, stream in the forest 10km NEE of Deniyaya; Galle Distr.; N6.36, E80.46; 2-v-2003, M. Bedjanič: BEDJANIČ (2010) ● Haycock, stream in Haycock area between tea plantations; Galle Distr.; N6.3422, E80.3099; 15-v-2009, M. Bedjanič: BEDJANIČ (2010) ● Kottawa, Kottawa Forest Reserve; Galle Distr.; N6.1116, E80.3145; 6-x-1973, R. & B. Robinson, NMNH - Smithsonian Institution: BEDJANIČ (2010)

Drepanosticta montana

Hakgala, small stream above Hakgala Botanical Garden; Nuwara Eliya Distr.; N6.9303, E80.8092; 19-v-2009, M. Bedjanič & S. Gunasinghe ● Kande Ela near Nuwara Eliya; Nuwara Eliya Distr.; N6.8884, E80.7799; 1-vi-1976, K.V. Krombein et al., NMNH - Smithsonian Institution ● Nuwara Eliya, forest stream near the old road to Pundaluoya, 6.5km NW of Nuwara Eliya; Nuwara Eliya Distr.; N6.999, E80.7271; 9-xi-2012, M. Bedjanič ● Bogawantalawa, stream at the road Hatton-Balangoda, at KM 27 post, Balangoda side; Ratnapura Distr.; N6.7514, E80.6989; 2-xi-2012, M. Bedjanič ● Haldummulla; Badulla Distr.; N6.7616, E80.8875; 23-v-2010, K. Conniff ● Haputale, small stream at the road Haputale- Boralanda; Badulla Distr.; N6.7938, E80.9211; 19-v-2009, M. Bedjanič & S. Gunasinghe ● Haputale, stream on the road to Boralanda, 3km WNW of Haputale; Badulla Distr.; N6.7751, E80.931; 15-vii-2012, M. Bedjanič ● Haputale, Tangemale bird sanctuary near Haputale; Badulla Distr.; N6.7695, E80.9347; 18-v-2009, M. Bedjanič & S. Gunasinghe; 19-v-2009, M. Bedjanič & S. Gunasinghe; 5-viii-2009, M. Bedjanič ● Haputale; Badulla Distr.; N6.7716, E80.9549; "May 1932", F.C. Fraser: FRASER (1933b) ● Passara, stream between tea plantations at the road Passara-Madulsima 4.5km NE of Passara; Badulla Distr.; N6.969, E81.1784; 3-viii-2009, M. Bedjanič ● Passara, stream on the road to Madulsima 7.5km NNE of Passara; Badulla Distr.; N7.0018, E81.1694; 3-viii-2009, M. Bedjanič; ● "Ceylan"; "1859", J. Nietner: SELYS (1860b);

Drepanosticta nietneri

Hindagala; Kandy Distr.; N7.2332, E80.5992; 1-x-1953, F. Keiser: LIEFTINCK (1955) ● Kandy; Kandy Distr.; N7.296, E80.6376; “1970”, O.S. Flint, M.A. Lieftinck unpubl. corresp.; 14-x-1924, : FRASER (1933b) ● Peradeniya Botanic Gardens; Kandy Distr.; N7.2708, E80.5934; 22-ix-1970, O.S. Flint, NMNH - Smithsonian Institution ● Ingiriya, Madakada forest, Nachchimalee; Kalutara Distr.; N6.7546, E80.1882; 6-x-2010, K. Conniff ● Morapitiya; Kalutara Distr.; N6.5361, E80.2627; 11-iii-2010, K. Conniff ● Kitulgala, Kelani Valley Forest Reserve; Kegalle Distr.; N6.9903, E80.3926; 6-x-2008, K. Conniff ● Mahabage, stream in rubber estate; Kegalle Distr.; N7.0083, E80.4437; 31-v-2007, N. & M. van der Poorten & K. Conniff ● Mahabage; Kegalle Distr.; N7.0169, E80.4384; 7-x-2008, K. Conniff ● Balangoda, stream at the road Balangoda-Ratnapura 6.5km SW of Balangoda; Ratnapura Distr.; N6.6212, E80.6494; 5-viii-2009, M. Bedjanič ● Belihul Oya, Belihul Oya Resthouse, stream below restaurant; Ratnapura Distr.; N6.7141, E80.7703; 18-v-2009, M. Bedjanič ● Belihul Oya, Belihul Oya stream 1km above the bridge on the road to Haputale; Ratnapura Distr.; N6.7267, E80.7587; 18-v-2009, M. Bedjanič ● Belihul Oya; Ratnapura Distr.; N6.7152, E80.7673; “September 1928”, FONSEKA (2000); 13-v-1932, F.C. Fraser: FRASER (1933b) ● Bopathella Falls near Ratnapura; Ratnapura Distr.; N6.803, E80.3729; 5-v-2003, M. Bedjanič ● Carney; Ratnapura Distr.; N6.7876, E80.442; 9-x-1953, F. Keiser: LIEFTINCK (1955) ● Eheliyagoda, cinnamon estate 8km SSE; Ratnapura Distr.; N6.7814, E80.2761; 8-xi-2011, K. Conniff ● Gilimale; Ratnapura Distr.; N6.7383, E80.4237; 19-vi-1976, K.V. Krombein et al., NMNH - Smithsonian Institution ● Opanayake, M.P. 84; Ratnapura Distr.; N6.6226, E80.655; 13-x-1970, O.S. Flint, NMNH - Smithsonian Institution ● Opanayake; Ratnapura Distr.; N6.6086, E80.6195; “October 1970”, FONSEKA (2000) ● Ratnapura; Ratnapura Distr.; N6.678, E80.3993; “1970”, O.S. Flint, M.A. Lieftinck unpubl. corresp.; 8-x-1953, F. Keiser: LIEFTINCK (1955) ● Kanneliya Forest; Galle Distr.; N6.2291, E80.3834; 11-vii-2008, N. van der Poorten, K. Conniff & S. Gunasinghe ● Sinharaja, main path from the entrance to Sinharaja Forest Biosphere Reserve to the Kakuna Falls on Aranuwu Dola Rivulet; Galle Distr.; N6.3662, E80.4755; 19-vii-2012, M. Bedjanič; 2-v-2003, M. Bedjanič; 29-iv-2003, M. Bedjanič ● Beraliya-Akuressa; Matara Distr.; N6.1001, E80.467; WCSG (2009) ● Dediyaagala; Matara Distr.; N6.1893, E80.4277; WCSG (2009) ● Kalubovitiyana; Matara Distr.; N6.3099, E80.4262; WCSG (2009) ● Mulatiyana; Matara Distr.; N6.1718, E80.5595; WCSG (2009) ● Sinharaja, right tributary of Gin Ganga at Elawatta Tea Factory; Matara Distr.; N6.3696, E80.5945; 30-iv-2003, M. Bedjanič ● Wilpita; Matara Distr.; N6.0931, E80.5387; WCSG (2009) ● Bambarakanda, Two small forest streams at the road Haputale-Belihul Oya 500m W of the rivulet that comes from Bambarakanda Falls; 28-x-2001, M. Bedjanič & A. Šalamun

Drepanosticta submontana

Corbet's Gap, Tangapoor Road; Kandy Distr.; N7.3655, E80.8377; 18-v-2007, N. & M. van der Poorten ● Kandy, Deiyannawela; Kandy Distr.; N7.2865, E80.6288; 17-x-1953, F. Keiser: LIEFTINCK (1955); 2-xi-1953, F. Keiser: LIEFTINCK (1955) ● Kandy, small stream at the road Kandy-Hantana 4km S of Kandy; Kandy Distr.; N7.2741, E80.636; 1-viii-2009, M. Bedjanič ● Kandy; Kandy Distr.; N7.296, E80.6376; 13-vii-1910, F. Wall, NHM London; “September 1924”, F. Wall, NHM London: FRASER (1933b) ● Urugalla, rivulet with cascades, 2km past Urugalla; Kandy Distr.; N7.3023, E80.8161; 31-vii-2009, M. Bedjanič ● Urugalla, stream 300m from the village; Kandy Distr.; N7.293, E80.8241; 6-vii-2012, M. Bedjanič ● Urugalla, stream 500m from the village; Kandy Distr.; N7.2942, E80.8209; 31-vii-2009, M. Bedjanič ● Wattegama, small stream between village Wattegama and Ras Ella Falls; Kandy Distr.; N7.3519, E80.6813; 21-x-2001, M. Bedjanič & A. Šalamun ● Elkaduwa; Matale Distr.; N7.4164, E80.6893; 8-x-2009, K. Conniff ● Hanagala, stream at the road pass Hanagala; Matale Distr.; N7.4528, E80.6861; 24-v-2009, M. Bedjanič ● Hunas Falls, Simpson's Forest; Matale Distr.; N7.3948, E80.6945; 16-x-2010, K. Conniff ● Hunas Falls; Matale Distr.; N7.4037, E80.6899; 11-x-2008, K. Conniff

Drepanosticta subtropica

Balangoda; Ratnapura Distr.; N6.6418, E80.6814; 21-vi-1926, G.M. Henry: FRASER (1933b) ● Pettigala; Ratnapura Distr.; N6.6645, E80.6358; 21-vi-1926, G.M. Henry: FRASER (1933b)

Drepanosticta tropica

Hakgala, small stream above Hakgala Botanical Garden; Nuwara Eliya Distr.; N6.9303, E80.8092; 24-iv-2003, M. Bedjanič; 19-v-2009, M. Bedjanič ● Kande Ela near Nuwara Eliya; Nuwara Eliya Distr.; N6.8884, E80.7799; 1-vi-1976, K.V. Krombein et al., NMNH - Smithsonian Institution ● Laxapana, small stream on the road Laxapana-Norton Bridge 1km E of Laxapana; Nuwara Eliya Distr.; N6.9263, E80.4895; 22-v-2010, K. Conniff ● Laxapana; Nuwara Eliya Distr.; N6.9269, E80.4823; 11-v-2010, K. Conniff ● Malwatta Falls on the road near Pussallewa, 5km towards Rambodde; Nuwara Eliya Distr.; N7.0757, E80.6576; 20-iv-2003, M. Bedjanič ● Nuwara Eliya, Hakgala and the slopes of the hills around at an altitude of 5000-6500 feet; Nuwara Eliya Distr.; N6.9394, E80.818; “May 1932”, FRASER (1933b) ● Nuwara Eliya, Moon plains Nature Reserve; Nuwara Eliya Distr.; N6.9627, E80.792; 22-iv-2003, M. Bedjanič ● Mahabage; Kegalle Distr.; N7.0169, E80.4384; 14-x-2010, K. Conniff ● Bogawantalawa, stream at the road Hatton-Balangoda, Balangoda side; Ratnapura Distr.; N6.7522, E80.6979; 2-xi-2012, M. Bedjanič ● Hakgala; Badulla Distr.; N6.9166, E80.8116; “April 1929”, FONSEKA (2000); 31-v-1953, F. Keiser: LIEFTINCK (1955) ● Haputale, Tangemale bird sanctuary near Haputale; Badulla Distr.; N6.7695, E80.9347; 18-v-2009, M. Bedjanič; 19-v-2009, M. Bedjanič ● Ohiya; Badulla Distr.; N6.8206, E80.8349; “September 1928”, FONSEKA (2000) ● Passara, stream between tea plantations at the road Passara-Madulsima 4.5km NE of Passara; Badulla Distr.; N6.969, E81.1784; 3-viii-2009, M. Bedjanič ● Passara, stream on the road to Madulsima 7km NNE of Passara; Badulla Distr.; N6.9981, E81.1703; 3-viii-2009, M. Bedjanič

Drepanosticta walli

Huluganga, rivulet Huluganga on the road Rangalla-Kandy; Kandy Distr.; N7.4018, E80.7453; 6-vii-2012, M. Bedjanič ● Huluganga, stream at the road Huluganga-Kandy, 500m S of the bridge on Huluganga; Kandy Distr.; N7.3973, E80.7424; 6-vii-2012, M. Bedjanič ● Kadugannawa; Kandy Distr.; N7.2545, E80.5165; 4-v-1932, F.C. Fraser: FRASER (1933b) ● Kandy; Kandy Distr.; N7.296, E80.6376; "May 1932", FONSEKA (2000); 13-ix-1924, F. Wall: FRASER (1931b) ● Peradeniya, forest streams 3km SE of Peradeniya; Kandy Distr.; N7.2527, E80.6215; 8-viii-1984, G. von Rosen, ZSM Munich ● Peradeniya; Kandy Distr.; N7.2641, E80.5947; 28-ii-2013, N. Abayalath ● Urugalla, rivulet on the road Urugalla-Teldeniya, at the bridge and paddyfields; Kandy Distr.; N7.311, E80.8028; 23-v-2009, M. Bedjanič ● Urugalla, rivulet with cascades, 2km past Urugalla; Kandy Distr.; N7.3023, E80.8161; 23-v-2009, M. Bedjanič; 31-vii-2009, M. Bedjanič; 6-vii-2012, M. Bedjanič ● Urugalla, stream 1.2km from the village; Kandy Distr.; N7.3012, E80.8157; 23-v-2009, M. Bedjanič ● Urugalla, stream 300m from the village; Kandy Distr.; N7.293, E80.8241; 6-vii-2012, M. Bedjanič ● Urugalla, stream 500m from the village; Kandy Distr.; N7.2942, E80.8209; 23-v-2009, M. Bedjanič; 31-vii-2009, M. Bedjanič ● Wattegama, stream 6km NE of Wattegama at the road to Huluganga; Kandy Distr.; N7.3825, E80.7279; 6-vii-2012, M. Bedjanič ● Wattegama, stream on the road Bandarella-Wattegama; Kandy Distr.; N7.3715, E80.7238; 24-v-2009, M. Bedjanič ● Wattegama, stream on the road to Wattegama; Kandy Distr.; N7.3848, E80.73; 24-v-2009, M. Bedjanič ● Wattegama, stream on the road Wattegama-Hunnas Falls; Kandy Distr.; N7.3768, E80.6784; 24-v-2009, M. Bedjanič ● Hunnas Falls, small seep 2km N of Hunnas Falls on Elkaduwa road; Matale Distr.; N7.4069, E80.6818; 27-x-2012, M. Bedjanič ● Hunnas Falls, small stream at the road from Hunnas Falls to Elkaduwa; Matale Distr.; N7.4083, E80.6815; 24-v-2009, M. Bedjanič ● Labugama, 38.6km ESE of Colombo; Colombo Distr.; N6.8546, E80.177; "September 1970", FONSEKA (2000) ● Tunmodera, near Labugama; Colombo Distr.; N6.8635, E80.1663; 19-ix-1970, O.S. Flint, NMNH - Smithsonian Institution ● Dabathgama, streams in small rainforest, 5.5km W of Gewilipitiya; Kegalle Distr.; N7.1738, E80.4062; 5-vii-2012, M. Bedjanič ● Ihala Kotte, near the Ihala Kotte Railway station; Kegalle Distr.; N7.2889, E80.473; 22-iii-2013, N. Abayalath ● Nilamalapala, stream at the road in Nilamalapala 11km SE of Kegalle; Kegalle Distr.; N7.1741, E80.4041; 5-vii-2012, M. Bedjanič

Platysticta maculata

Huluganga, stream at the road Huluganga-Kandy, 500m S of the bridge on Huluganga; Kandy Distr.; N7.3973, E80.7424; 6-vii-2012, M. Bedjanič ● Kandy, small stream at the road to Digana 10.5 km S of Kandy; Kandy Distr.; N7.2375, E80.6408; 1-viii-2009, M. Bedjanič ● Kandy, small stream at the road to Digana 10km S of Kandy; Kandy Distr.; N7.2399, E80.6396; 1-viii-2009, M. Bedjanič ● Nawalapitiya, stream at the road Nawalapitiya-Kandy 5km NE of Nawalapitiya; Kandy Distr.; N7.0942, E80.5555; 29-vii-2009, M. Bedjanič ● Peradeniya, forest streams 3km SE of Peradeniya; Kandy Distr.; N7.2527, E80.6215; 10-viii-1984, G. von Rosen, ZSM Munich; 23-viii-1984, G. von Rosen, ZSM Munich; 8-viii-1984, G. von Rosen, ZSM Munich ● Urugalla, Woodside; Kandy Distr.; N7.2763, E80.8284; 14-iv-1930, F.C. Fraser, Naturalis Biodiversity Center Leiden ● Urugalla; Kandy Distr.; N7.2945, E80.7722; 19-iv-1924, F. Wall, NHM London: FRASER (1931b) ● Hapugastalawa, small seep on the road Nawalapitiya-Harangala, 500m SW of Hapugastalawa; Nuwara Eliya Distr.; N7.0541, E80.5688; 13-vii-2012, M. Bedjanič ● Hapugastalawa, stream at the Harangala road, 1.8km ESE of Hapugastalawa; Nuwara Eliya Distr.; N7.0512, E80.5888; 13-vii-2012, M. Bedjanič ● Harangala, stream at the road Harangala-Pundaluoya, 1.5km SE of Kothmale Dam; Nuwara Eliya Distr.; N7.0483, E80.604; 13-vii-2012, M. Bedjanič ● Harangala, stream at the road Harangala-Pundaluoya, 1km SSE of Kothmale Dam; Nuwara Eliya Distr.; N7.0506, E80.5988; 13-vii-2012, M. Bedjanič ● Harangala, stream at the road Harangala-Pundaluoya, 4km SE of Kothmale Dam; Nuwara Eliya Distr.; N7.0424, E80.6271; 13-vii-2012, M. Bedjanič ● Laxapana, 4km NE; Nuwara Eliya Distr.; N6.9606, E80.4998; 26-ix-1970, O.S. Flint, NMNH - Smithsonian Institution ● Laxapana; Nuwara Eliya Distr.; N6.9269, E80.4823; 8-x-2009, K. Conniff; 1-v-2010, K. Conniff ● Norton Bridge, stream on the B43 road 1.5km WNW of Norton Bridge; Nuwara Eliya Distr.; N6.9171, E80.5075; 28-vii-2009, M. Bedjanič & K. Conniff ● Norton Bridge, stream on the road from Laxapana to Norton Bridge 3.3km NW of Norton Bridge; Nuwara Eliya Distr.; N6.9305, E80.49; 28-vii-2009, M. Bedjanič & K. Conniff ● Norton Bridge, stream on the road from Laxapana to Norton Bridge 3km NW of Norton Bridge; Nuwara Eliya Distr.; N6.9289, E80.4983; 28-vii-2009, M. Bedjanič & K. Conniff ● Norton Bridge, B71, Adams Peak Road; Nuwara Eliya Distr.; N6.9483, E80.5062; 8-vii-2010, N. & M. van der Poorten & K. Conniff ● Pundaluoya, small seep on the road to Rambodda, 2.7km NNW of Pundaluoya; Nuwara Eliya Distr.; N7.0374, E80.6576; 12-vii-2012, M. Bedjanič ● Pundaluoya, small stream and waterfall 700m NE of Pundaluoya; Nuwara Eliya Distr.; N7.0197, E80.6688; 12-vii-2012, M. Bedjanič ● Pundaluoya, stream 1.8km NNW of Pundaluoya; Nuwara Eliya Distr.; N7.0395, E80.6588; 12-vii-2012, M. Bedjanič ● Pundaluoya, stream at the road to Eco Lanka Estate, 1.8km NW of Pundaluoya; Nuwara Eliya Distr.; N7.0211, E80.6509; 14-vii-2012, M. Bedjanič ● Pundaluoya, stream on the road to Rambodda, 1.6km NNW of Pundaluoya; Nuwara Eliya Distr.; N7.0285, E80.6612; 14-vii-2012, M. Bedjanič ● Pundaluoya, tributary of Pundaluoya river between tea plantations, 1km E of Pundaluoya; Nuwara Eliya Distr.; N7.0166, E80.674; 14-vii-2012, M. Bedjanič ● Pundaluoya; Nuwara Eliya Distr.; N7.0101, E80.675; "August 1889", E.E. Green: KIRBY (1891) ● Rambodde Falls, at tunnel; Nuwara Eliya Distr.; N7.0489, E80.6961; 11-vii-2012, M. Bedjanič; 12-vii-2012, M. Bedjanič ● Rambodde, small stream at the road Rambodde-Sangilipalama, 1.2km NW of Rambodda tunnel; Nuwara Eliya Distr.; N7.0602, E80.6888; 12-vii-2012, M. Bedjanič ● Rambodde, stream at the road near quarry, 800m S of Rambodde tunnel; Nuwara Eliya Distr.; N7.0491, E80.6997; 11-vii-2012, M. Bedjanič ● Rambodde, stream at the road Rambodde-Sangilipalama, 1.4km NW of Rambodda tunnel; Nuwara Eliya Distr.; N7.0604, E80.6874; 12-vii-2012, M. Bedjanič ● Rambodde, stream at the road Rambodde-Sangilipalama, 1.7km NW of Rambodda tunnel; Nuwara Eliya Distr.; N7.0613, E80.6845; 12-vii-2012, M. Bedjanič ● Rambodde; Nuwara Eliya Distr.; N7.0522, E80.6937; "1859", J. Nietner: HAGEN (1859); 9-v-1932, F.C. Fraser, NHM London: FRASER (1933b) ● Talawantenne, stream at the road to Pundaluoya, 1.8km SW of Talawantenne junction; Nuwara Eliya Distr.; N7.0537, E80.6765; 12-vii-2012, M.

Bedjanič ● Talawantenne, stream at the road to Pundaluoya, 600m WSW of Talawantenne junction; Nuwara Eliya Distr.; N7.0673, E80.6801; 12-vii-2012, M. Bedjanič ● Talawantenne, stream at the road to Pundaluoya, 800m W of Talawantenne junction; Nuwara Eliya Distr.; N7.0691, E80.6786; 12-vii-2012, M. Bedjanič ● Balangoda, stream in Pettigala tea estate, 4.2km W of Balangoda; Ratnapura Distr.; N6.6531, E80.6615; 16-vii-2012, M. Bedjanič ● Uwella, primary forest on the road Uwella-Ratnapura, 11.5km NW of Balangoda; Ratnapura Distr.; N6.6968, E80.6059; 16-vii-2012, M. Bedjanič

Elatoneura leucostigma

Horton Plains National Park; Nuwara Eliya Distr.; N6.7838, E80.7909; 19-iii-1962, P. Brinck, H. Andersson & L. Cederholm: LIEFTINCK (1971a) ● Nuwara Eliya; Nuwara Eliya Distr.; N6.9738, E80.7622; 7-v-1927, G.M. Henry: FRASER (1933c) ● Haputale, stream on the road to Borallanda, 3km WNW of Haputale; Badulla Distr.; N6.7751, E80.931; 15-vii-2012, M. Bedjanič ● Haputale, Tangemale bird sanctuary near Haputale; Badulla Distr.; N6.7695, E80.9347; 19-v-2009, M. Bedjanič & S. Gunasinghe; 5-viii-2009, M. Bedjanič

Elatoneura oculata

Labugama, 38.6km ESE of Colombo; Colombo Distr.; N6.8546, E80.177; 21-i-1962, P. Brinck, H. Andersson & L. Cederholm: LIEFTINCK (1971a); 21-v-2009, K. Conniff ● Labugama, small stream near the temple in Labugama; Colombo Distr.; N6.8472, E80.1725; 12-v-2009, M. Bedjanič ● Labugama, stream at the road to Kalutawa reservoir near Labugama; Colombo Distr.; N6.8378, E80.1623; 12-v-2009, M. Bedjanič ● Padukka; Colombo Distr.; N6.8407, E80.0848; "1970", O.S. Flint, M.A. Lieftinck unpubl. corresp. ● Athwelthota, river at Athwelthota village, near Morapitiya turn-off; Kalutara Distr.; N6.5446, E80.283; 14-v-2009, M. Bedjanič ● Athwelthota, swampy stream beside the road along the river, 500m SE of Athwelthota; Kalutara Distr.; N6.5396, E80.288; 7-xi-2012, M. Bedjanič ● Badureliya, stream in Lathaspura village; Kalutara Distr.; N6.5243, E80.2108; 14-v-2009, M. Bedjanič ● Morapitiya; Kalutara Distr.; N6.5361, E80.2627; 16-vi-2008, G. de Silva Wijeyeratne ● Galapitigama, small shady stream 12km SE of Warakapola; Kegalle Distr.; N7.135, E80.2645; 15-i-2013, N. & M. van der Poorten ● Kithulgala, Makandawa rainforest; Kegalle Distr.; N6.9917, E80.4048; 10-xi-2012, M. Bedjanič ● Kithulgala, stream and abandoned ricefield near Kelani river 2km upstream of the bridge; Kegalle Distr.; N6.9786, E80.426; 22-v-2009, M. Bedjanič ● Kitulgala, Kelani Valley Forest Reserve; Kegalle Distr.; N6.9903, E80.3926; 21-x-2004, A. Salgado: BEDJANIČ (2008) ● Ayagama, Mia Ella rivulet and waterfall, 4km NW of Ayagama; Ratnapura Distr.; N6.6642, E80.286; 6-xi-2012, M. Bedjanič ● Ayagama, stream at the road to Egaloya, 4km WNW of Ayagama; Ratnapura Distr.; N6.6481, E80.2751; 6-xi-2012, M. Bedjanič ● Gallella, right tributary of the Black river that flows into the Kalu Ganga river at the city Ratnapura, 5 km SE from the village Gallella; Ratnapura Distr.; N6.6695, E80.4910; 29-i-1995, M. Bedjanič: BEDJANIČ (2002) ● Hingalangoda, stream in the rubber plantation at the road Idangoda-Ayagama, 6.5km NW of Ayagama; Ratnapura Distr.; N6.6915, E80.2877; 6-xi-2012, M. Bedjanič ● Kalawana, rivulet 2.5km WNW of Kalawana; Ratnapura Distr.; N6.5358, E80.3729; 7-xi-2012, M. Bedjanič ● Kapugala, stream at the road Ugelkaltotta-Badula, 9.8km SW of Kalthota junction; Ratnapura Distr.; N6.607, E80.8188; 3-xi-2012, M. Bedjanič ● Sinharaja Forest Biosphere Reserve; Ratnapura Distr.; N6.4087, E80.4447; 10-v-2006, K. Conniff: BEDJANIČ (2008); WCSG (2009) ● Sinharaja, rainforest along the main trail leading to research camp; Ratnapura Distr.; N6.4196, E80.4196; 2-vii-2007, N. & M. van der Poorten; 20-vi-2007, N. & M. van der Poorten; 12-ii-2005, N. & M. van der Poorten ● Sinharaja, Kakuna Falls on Aranuwa Dola Rivulet in Sinharaja Forest Biosphere Reserve; Ratnapura Distr.; N6.3821, E80.4789; 4-xi-2001, M. Bedjanič & A. Šalamun: BEDJANIČ (2008) ● Sinharaja, Martin's and core reserve; Ratnapura Distr.; N6.4201, E80.4153; 15-iii-2007, G. de Silva Wijeyeratne ● Sinharaja, near Kudawe; Ratnapura Distr.; N6.26, E80.25; 7-v-2007, N. & M. van der Poorten ● Sinharaja, stream 500m SW of the Field Research Station in Sinharaja Forest Biosphere Reserve; Ratnapura Distr.; N6.4175, E80.4183; 1-ii-1995, M. Bedjanič: BEDJANIČ (2002) ● Sinharaja, stream and pool half way from entrance to research station; Ratnapura Distr.; N6.4236, E80.4169; 13-v-2009, M. Bedjanič ● Udugalakanda, stream among paddy fields on the road to Ingiriya; Ratnapura Distr.; N6.6774, E80.2416; 6-xi-2012, M. Bedjanič ● Weddagala, stream at Weddagala village; Ratnapura Distr.; N6.4628, E80.43; 14-v-2009, M. Bedjanič ● Elpitiya; Galle Distr.; N6.2924, E80.1621; 19-vii-2006, N. & M. van der Poorten ● Haycock, stream at the road Kanneliya-Haycock; Galle Distr.; N6.2594, E80.3286; 15-v-2009, M. Bedjanič ● Haycock, stream in Haycock range; Galle Distr.; N6.3335, E80.3112; 15-v-2009, M. Bedjanič ● Haycock, stream on the way to Haycock; Galle Distr.; N6.3422, E80.3236; 15-v-2009, M. Bedjanič ● Hiyare Forest Reserve; Galle Distr.; N6.0708, E80.3203; 18-v-2006, N. & M. van der Poorten; 7-x-2006, K. Conniff ● Hiyare Lake, small tributaries to Hiyare lake on the N shore; Galle Distr.; N6.0584, E80.3199; 15-v-2009, M. Bedjanič ● Hiyare Lake; Galle Distr.; N6.0586, E80.3165; 20-iv-2008, K. Conniff; WCSG (2008); 14-iv-2004, K. Conniff: BEDJANIČ (2008) ● Kanneliya Reserve, small stream near the entrance; Galle Distr.; N6.2509, E80.3381; 7-v-2012, A. Sumanapala ● Kanneliya; Galle Distr.; N6.2455, E80.3544; WCSG (2008) ● Kottawa; Galle Distr.; N6.1013, E80.3137; 24-iv-1892, W.F. Yerbury: KIRBY (1894) ● Nakiyadiya, forest reserve 1km N of Udagama Central; Galle Distr.; N6.1755, E80.385; WCSG (2008) ● Pitagala; Galle Distr.; N6.3459, E80.2159; 20-vii-2006, N. & M. van der Poorten ● Sinharaja, forest 4km NE of Neluwa village; Galle Distr.; N6.4049, E80.3785; WCSG (2008) ● Sinharaja, Gin Ganga River at Pitadeniya Forest Camp in Sinharaja Forest Biosphere Reserve; Galle Distr.; N6.3694, E80.4591; 4-xi-2001, M. Bedjanič & A. Šalamun: BEDJANIČ (2008) ● Sinharaja, main path from the entrance to Sinharaja Forest Biosphere Reserve to the Kakuna Falls on Aranuwa Dola Rivulet; Galle Distr.; N6.3662, E80.4755; 2-v-2003, M. Bedjanič: BEDJANIČ (2008); 29-iv-2003, M. Bedjanič: BEDJANIČ (2008) ● Beraliya-Akuressa; Matara Distr.; N6.1001, E80.4467; WCSG (2009) ● Dediya; Matara Distr.; N6.1893, E80.4277; WCSG (2009) ● Deniyaya, Gin Ganga river 1km downstream of Deniyaya; Matara Distr.; N6.3525, E80.5668; 20-vii-2012, M. Bedjanič ● Deniyaya, Gin Ganga River 2.5km downstream of Deniyaya village; Matara Distr.; N6.3531, E80.579; 30-iv-2003, M. Bedjanič: BEDJANIČ (2008) ● Kalubovitiyana; Matara Distr.; N6.3099, E80.4262; WCSG (2009) ● Mulatiyana; Matara Distr.; N6.1718, E80.5595; WCSG (2009)

● Panilkanda; Matara Distr.; N6.3489, E80.6524; WCSG (2009) ● Sinharaja, right tributary of Gin Ganga at Elawatta Tea Factory; Matara Distr.; N6.3696, E80.5945; 30-iv-2003, M. Bedjanič: BEDJANIČ (2008) ● Viharakele; Matara Distr.; N6.1042, E80.5994; WCSG (2009) ● Wilpita; Matara Distr.; N6.0931, E80.5387; WCSG (2009)

Elattonura tenax

Corbet's Gap, 3.8km towards Meemure; Kandy Distr.; N7.4024, E80.8493; 27-iii-2007, N. & M. van der Poorten; 29-v-2012, N. & M. van der Poorten ● Corbet's Gap, Nitre Cave; Kandy Distr.; N7.3996, E80.8232; 29-v-2012, N. & M. van der Poorten ● Corbet's Gap, Tangapoor Road; Kandy Distr.; N7.3655, E80.8377; 18-v-2007, N. & M. van der Poorten ● Loolwatta, stream 700m NE of Loolwatta near Dumbanagala Chalet; Kandy Distr.; N7.372, E80.8494; 7-vii-2012, M. Bedjanič ● Madugoda near Urugalla; Kandy Distr.; N7.3148, E80.8665; 15-ix-1953, F. Keiser: LIEFTINCK (1955) ● Meemure, small stream; Kandy Distr.; N7.4427, E80.8568; 26-xi-2007, N. & M. van der Poorten ● Knuckles, B274, Rattota-Illukumbura Road, KM 28; Matale Distr.; N7.55, E80.733; 3-iv-2007, N. & M. van der Poorten ● Knuckles, tiny waterfall near KM 28 on B274; Matale Distr.; N7.5217, E80.6896; 15-iv-2005, N. & M. van der Poorten ● Dalhousie, right tributary of the Seetha Gangula river 1 km downstream of the village Dalhousie; Nuwara Eliya Distr.; N6.8242, E80.5177; 23-i-1995, M. Bedjanič: BEDJANIČ (2002) ● Horton Plains National Park; Nuwara Eliya Distr.; N6.7838, E80.7909; DE SILVA WIJEYERATNE (2012b) ● Laxapana; Nuwara Eliya Distr.; N6.9269, E80.4823; "1970", O.S. Flint, M.A. Lieftinck unpubl. corresp.; 8-x-2009, K. Conniff ● Norton Bridge, B71, Adams Peak Road; Nuwara Eliya Distr.; N6.9483, E80.5062; 8-vii-2010, N. & M. van der Poorten & K. Conniff ● Pundaluoya, Lansilan Ella river on the old road Pundaluoya-Nuwara Eliya, 8.5km NW of Nuwara Eliya; Nuwara Eliya Distr.; N6.9995, E80.7032; 15-vii-2012, M. Bedjanič ● Rambodde, Puna Oya 1.5km S of Rambodde; Nuwara Eliya Distr.; N7.0414, E80.6966; 16-iv-1976, G. von Rosen, ZSM Munich ● Rambodde; Nuwara Eliya Distr.; N7.0522, E80.6937; "1858", J. Nietner: HAGEN (1858) ● Talawakele, Great Western Estate; Nuwara Eliya Distr.; N6.9441, E80.6939; 3-vi-2012, A. Sumanapala; 2-vi-2012, A. Sumanapala ● Thawalammenne; Nuwara Eliya Distr.; N7.0727, E80.682; 16-ix-1977, K.V. Krombein et al., NMNH - Smithsonian Institution ● Kitulgala, Kelani Valley Forest Reserve; Kegalle Distr.; N6.9903, E80.3926; 6-x-2008, K. Conniff ● Mahabage, Ing Oya; River Resort Hotel; Kegalle Distr.; N7.0118, E80.4346; 25-vii-2009, M. Bedjanič ● Mahabage, Ing Oya; Kegalle Distr.; N7.0068, E80.428; 11-vi-2006, K. Conniff; 14-x-2010, K. Conniff; 1-vii-2006, K. Conniff ● Mahabage; Kegalle Distr.; N7.0169, E80.4384; 7-x-2008, K. Conniff; 8-iv-2009, K. Conniff; 9-x-2009, K. Conniff ● Malibode; Kegalle Distr.; N6.9006, E80.4144; 31-iii-2007, N. & M. van der Poorten ● Peak Wilderness Sanctuary; Kegalle Distr.; N6.8473, E80.4759; 1-i-2010, S. Abayarathne ● Bogawantalawa, stream in the forest S of the road pass between Hatton and Balangoda, Balangoda side; Ratnapura Distr.; N6.7558, E80.6928; 4-xi-2012, M. Bedjanič ● Horton Plains, Belihul Oya; Ratnapura Distr.; N6.7525, E80.7732; 3-x-1970, O.S. Flint, NMNH - Smithsonian Institution ● Kuruwita, Deerwood, Kuruwita, 9.6km NNW of Ratnapura, slopes of Botiyagala Mountain; Ratnapura Distr.; N6.7983, E80.; 17-ii-1962, P. Brinck, H. Andersson & L. Cederholm: LIEFTINCK (1971a) ● Sinharaja Forest Biosphere Reserve; Ratnapura Distr.; N6.4087, E80.4447; 6-x-2012, S.S. Fernando ● Sinharaja, stream 500m SW of the Field Research Station in Sinharaja Forest Biosphere Reserve; Ratnapura Distr.; N6.4175, E80.4183; 1-ii-1995, M. Bedjanič: BEDJANIČ (2002) ● Sinharaja, stream in Sinharaja Forest Biosphere Reserve 1km NE of Beverly Estate Lower Division; Ratnapura Distr.; N6.4088, E80.5465; 1-v-2003, M. Bedjanič ● Sinharaja, stream near Research Station; Ratnapura Distr.; N6.4172, E80.4232; 31-i-2010, C. Hassel ● Sooriyakanda, Morningside Forestry Bungalow; Ratnapura Distr.; N6.4296, E80.6172; 10-x-2008, N. & M. van der Poorten ● Sooriyakanda, road past Morningside Forestry Bungalow; Ratnapura Distr.; N6.4273, E80.6133; 11-x-2008, N. & M. van der Poorten ● Thummodara, 550m NW of Thummodara in Peak Wilderness Sanctuary; Ratnapura Distr.; N6.8246, E80.455; 12-x-2012, A. Sumanapala ● Upper reaches of Kalu-Ganga on the south flank of Adam's Peak, near Carney-Estate, deep gorge in primary rainforest; Ratnapura Distr.; N6.7876, E80.4581; 22-xi-1970, H.H. Costa & F. Starmühlner: COSTA & STARMÜHLNER (1972) ● Kanneliya Forest; Galle Distr.; N6.2291, E80.3834; 7-v-2012, A. Sumanapala ● Sinharaja, path from Kakuna Falls on Aranuwu Dola Rivulet in Sinharaja Forest Biosphere Reserve to the east and back towards hanging bridge and entrance to the park; Galle District; N6.3747, E80.4771; 2-v-2003, M. Bedjanič ● Dediyaigala; Matara Distr.; N6.1893, E80.4277; WCSG (2009) ● Deniyaya, stream between tea plantation above Beverly Estate Lower Division; Matara Distr.; N6.3513, E80.5385; 1-v-2003, M. Bedjanič; 19-ii-2005, N. & M. van der Poorten ● Bambarakanda Falls; Badulla Distr.; N6.7725, E80.8476; 28-x-2001, M. Bedjanič & A. Šalamun ● Bandarawella; Badulla Distr.; N6.8315, E80.9814; 5-x-1924, F. Wall, NHM London ● Diyatalawa; Badulla Distr.; N6.8154, E80.9411; 14-vii-1901, E.E. Green: LAIDLAW (1924); 17-ix-1924, F.C. Fraser, NHM London: FRASER (1933a) ● Hakgala; Badulla Distr.; N6.9166, E80.8116; "1932", FRASER (1933a) ● Haputale; Badulla Distr.; N6.7716, E80.9549; 13-v-1932, F.C. Fraser, NHM London: FRASER (1933a) ● Passara, stream at the road Passara-Madulsima 3km NE of Passara; Badulla Distr.; N6.9547, E81.1701; 3-viii-2009, M. Bedjanič ● Passara, stream between tea plantations at the road Passara-Madulsima 4.5km NE of Passara; Badulla Distr.; N6.969, E81.1784; 3-viii-2009, M. Bedjanič ● Passara, stream on the road to Madulsima 7.5km NNE of Passara; Badulla Distr.; N7.0018, E81.1694; 3-viii-2009, M. Bedjanič ● Passara, stream on the road to Madulsima 7km NNE of Passara; Badulla Distr.; N6.9981, E81.1703; 3-viii-2009, M. Bedjanič ● Passara; Badulla Distr.; N6.9306, E81.147; 6-vi-1892, W.F. Yerbury: KIRBY (1894)

Anisogomphus ceylonicus

Rambodde; Nuwara Eliya Distr.; N7.0522, E80.6937; "1859", J. Nietner: SELYS (1878) ● Rambukpath Oya, 16km NW of Hatton; Nuwara Eliya Distr.; N6.9915, E80.4542; 18-iii-1962, P. Brinck, H. Andersson & L. Cederholm: LIEFTINCK (1971a)

Burmagomphus pyramidalis sinuatus

Gampola, Atabage Oya 6km out of Gampola; Kandy Distr.; N7.1141, E80.5982; 20-iv-2003, M. Bedjanič ● Haragama, banks of Mahaweliganga; Kandy Distr.; N7.2589, E80.7285; 18-ix-1938, M.A. Lieftinck: LIEFTINCK (1940) ● Haragama, tributary of Mahaweliganga, near Mailapitya; Kandy Distr.; N7.2253, E80.7444; 17-ix-1938, M.A. Lieftinck: LIEFTINCK (1940) ● Kalu Ganga between Gampola and Pussellawa near Waugpitue; Kandy Distr.; N7.1141, E80.6157; 20-iv-2003, M. Bedjanič ● Kandy, Citadel Hotel and its surroundings at Mahaweli Ganga River; Kandy Distr.; N7.2975, E80.6199; 7-v-2006, H.-U. Kohler ● Kandy, Mahaweli Ganga river near the Citadel Hotel; Kandy Distr.; N7.2971, E80.6167; 16-iv-2003, M. Bedjanič ● Rathna Ella Falls; Kandy Distr.; N7.3719, E80.9235; 20-x-2001, M. Bedjanič & A. Šalamun ● Talatu Oya Rivulet 2km S of the Kandy-Haragama road; Kandy Distr.; N7.2513, E80.6882; 17-x-2001, M. Bedjanič & A. Šalamun ● Urugalla; Kandy Distr.; N7.2945, E80.7722; 8-v-1932, F.C. Fraser: FRASER (1933d) ● 4.8km S of Minneriya; Matale Distr.; N7.9658, E80.8385; 11-ii-1962, P. Brinck, H. Andersson & L. Cederholm: LIEFTINCK (1971a) ● Pinnawala, Maha Oya river at Pinnawella Elephant Orphanage; Kegalle Distr.; N7.3001, E80.3868; 19-x-2001, M. Bedjanič & A. Šalamun ● Pinnawalla, stream at the road Kegalle-Pinnawella, 1km N of the road Kegalle-Kandy; Kegalle Distr.; N7.259, E80.378; 5-vii-2012, M. Bedjanič ● Ayagama, river past Ayagama at the Idangoda-Kalawana road; Ratnapura Distr.; N6.6446, E80.3138; 12-v-2009, M. Bedjanič ● Deniyaya, Gin Ganga river 1km downstream of Deniyaya; Matara Distr.; N6.3525, E80.5668; 20-vii-2012, M. Bedjanič ● Deniyaya, Gin Ganga River 2.5km downstream of Deniyaya village; Matara Distr.; N6.3531, E80.579; 30-iv-2003, M. Bedjanič ● Sinharaja, right tributary of Gin Ganga at Elawatta Tea Factory; Matara Distr.; N6.3696, E80.5945; 30-iv-2003, M. Bedjanič ● Dunhinda Falls near Badulla; Badulla Distr.; N7.018, E81.0631; 16-viii-1973, G. Eskis, NMNH - Smithsonian Institution

Cyclogomphus gynostylus

Giant's Tank, 16km SE of Mannar; Mannar Distr.; N8.8857, E80.0351; 26-xii-2011, A. Sumanapala ● Giant's Tank, west side of the tank, roadside at the edge of paddyfields, Mannar Distr.; N8.8640, E80.0147; 4-xii-2011, N. & M. van der Poorten ● Kurunegala, tank; Kurunegala Distr.; N7.4936, E80.3582; 23-vi-1953, F. Keiser: LIEFTINCK (1955) ● Anuradhapura, Balaya Wewa, 12.8km E of Padaviya; Anuradhapura Distr.; N8.848, E80.8593; 4-xi-1970, O.S. Flint, M.A. Lieftinck unpubl. corresp. ● Padaviya; Anuradhapura Distr.; N8.8435, E80.7407; 12-iii-1976, K.V. Krombein et al., NMNH - Smithsonian Institution ● Kandy, Citadel Hotel and its surroundings at Mahaweli Ganga River; Kandy Distr.; N7.2975, E80.6199; 7-v-2006, H.-U. Kohler ● Kandy, Kandy Lake; Kandy Distr.; N7.2903, E80.6395; 4-ix-1924, F. Wall: FRASER (1933d); 23-x-2001, M. Bedjanič & A. Šalamun ● Kandy, Mahaweli Ganga river near the Citadel Hotel; Kandy Distr.; N7.2971, E80.6167; 16-iv-2003, M. Bedjanič ● Kandy, Udawatakelle Sanctuary; Kandy Distr.; N7.3011, E80.6397; 1-x-1973, K.V. Krombein, P.B. Karunaratne & P. Fernando, NMNH - Smithsonian Institution ● Kandy, Wace Park; Kandy Distr.; N7.2919, E80.6466; 25-v-1953, F. Keiser: LIEFTINCK (1955) ● Kandy; Kandy Distr.; N7.296, E80.6376; "May 1911", E.E. Green: LAIDLAW (1924); 8-v-1932, F.C. Fraser: FRASER (1933d) ● Colombo, irrigation canal along a paddy area east of Colombo; Colombo Distr.; N6.9306, E79.8587; 20-iv-2005, K. Conniff; 3-iv-2006, G. de Silva Wijeyeratne ● Hanwella, drain and small stream at Meegahawatta wetland 1.3km S of Hanwella; Colombo Distr.; N6.897, E80.0843; 16-iv-2011, K. Conniff & H.M. Lankika: LANKIKA et al. (2012) ● Talangama Tank, Battaramulla; Colombo Distr.; N6.8879, E79.9452; 10-v-2009, K. Conniff; 4-x-2009, G. de Silva Wijeyeratne; 3-x-2009, K. Conniff; 25-v-2009, K. Conniff; 30-iii-2009, K. Conniff ● Talangama, Hokandara Ditch; Colombo Distr.; N6.8791, E79.9483; 25-v-2009, M. Bedjanič; 14-v-2006, K. Conniff; 27-v-2007, N. & M. van der Poorten & K. Conniff; 6-iii-2007, K. Conniff; 1-v-2006, K. Conniff; 20-iv-2006, K. Conniff; 23-iii-2007, N. & M. van der Poorten & K. Conniff ● Ambatenne; Kalutara Distr.; N6.5332, E80.0796; "September 1932", F.C. Fraser: FRASER (1934) ● Pinnawala, Maha Oya river at Pinnawella Elephant Orphanage; Kegalle Distr.; N7.3001, E80.3868; 19-x-2001, M. Bedjanič & A. Šalamun ● Tissamaharama; Hambantota Distr.; N6.27, E81.2926; 27-xi-2007, O. Prosick ● Bopathgoda, Nilwala river in the village; Matara Distr.; N6.1589, E80.4879; 16-v-2009, M. Bedjanič ● Deniyaya, Gin Ganga river 1km downstream of Deniyaya; Matara Distr.; N6.3525, E80.5668; 20-vii-2012, M. Bedjanič ● Deniyaya, Gin Ganga River 500m upstream of Deniyaya village; Matara Distr.; N6.3441, E80.555; 5-xi-2001, M. Bedjanič & A. Šalamun ● Deniyaya, Handford Estate; Matara Distr.; N6.3461, E80.5819; 4-iii-2011, K. Conniff & S. Gunasinghe ● Inginiyagala; Moneragala Distr.; N7.2193, E81.5343; 2-vi-1975, D.H. Messersmith, G.L. Williams & P.B. Karunaratne, NMNH - Smithsonian Institution ● Uda Walawe, Walawe river past Kalu's Hideaway in Udawalawe; Moneragala Distr.; N6.4151, E80.8465; 19-iv-2013, A. Samarajewa

Heliogomphus lyratus

Kithulgala, small stream in the secondary forest 1km S of the bridge near Plantation Hotel in Kithulgala; Kegalle Distr.; N6.9844, E80.4137; 21-v-2009, M. Bedjanič ● Diyadawa, stream on the road Morawaka-Diyadawa on the slopes of Diyadawa forest; Matara Distr.; N6.3122, E80.543; 16-v-2009, M. Bedjanič ● Haldummulla; Badulla Distr.; N6.7616, E80.8875; 24-vi-1926, G.M. Henry: FRASER (1933d)

Heliogomphus nietneri

Corbet's Gap, 3.8km towards Meemure; Kandy Distr.; N7.4024, E80.8493; 18-iv-2005, N. & M. van der Poorten ● Knuckles, B274, Rattota-Illukumbura Road, KM 28; Matale Distr.; N7.55, E80.733; 15-iv-2005, N. & M. van der Poorten; 16-v-2006, N. & M. van der

Poorten; 31-iii-2010, N. & M. van der Poorten; 4-iv-2005, N. & M. van der Poorten ● Rambodde; Nuwara Eliya Distr.; N7.0522, E80.6937; J. Nietner: SELYS (1878)

Macrogomphus annulatus keiseri

Peradeniya; Kandy Distr.; N7.2641, E80.5947; 2-iv-1905, N.K. Jordine, NHM London ● Weragamtota; Kandy Distr.; N7.3185, E80.9796; 14-ix-1953, F. Keiser: LIEFTINCK (1955) ● Matale; Matale Distr.; N7.4694, E80.6173; “1970”, K.V. Krombein et al., M.A. Lieftinck unpubl. corresp.

Macrogomphus lankanensis

Murunkan; Mannar Distr.; N8.8336, E80.0493; “July 1922”, FRASER (1933d) ● Vavuniya; Vavuniya Distr.; N8.7588, E80.4894; 21-iii-1970, O.S. Flint, M.A. Lieftinck unpubl. corresp. ● Anuradhapura, Balaya Wewa, 12.8km E of Padaviya; Anuradhapura Distr.; N8.848, E80.8593; 4-xi-1970, O.S. Flint, M.A. Lieftinck unpubl. corresp. ● Haragama, tributary of Mahaweliganga, near Mailapitya; Kandy Distr.; N7.2253, E80.744; 18-ix-1938, M.A. Lieftinck: LIEFTINCK (1940) ● Haragama; Kandy Distr.; N7.2478, E80.7203; “August 1903”, E.E. Green: LAIDLAW (1924); 18-vii-1910, E.E. Green: LAIDLAW (1924) ● Kandy, Teldaniya; Kandy Distr.; N7.2985, E80.7618; “1970”, K.V. Krombein et al., M.A. Lieftinck unpubl. corresp.; 10-v-1975, Sanjaya & P.B. Karunaratne, NMNH - Smithsonian Institution ● Samadhi Centre; Kandy Distr.; N7.3624, E80.7351; 10-i-2010, K. Conniff ● Hanwella, drain and small stream at Meegahawatta wetland 1.3km S of Hanwella; Colombo Distr.; N6.897, E80.0843; 16-iv-2011, K. Conniff & H.M. Lankika ● Kaduwela, Bomiriya; Colombo Distr.; N6.9311, E80.0053; 28-viii-2008, A. Salgado; 29-vi-2007, A. Salgado; 25-vi-2008, A. Salgado; 20-vi-2008, A. Salgado; 18-v-2008, A. Salgado; 15-vi-2007, A. Salgado ● Talangama Tank, Battaramulla; Colombo Distr.; N6.8879, E79.9452; 27-vi-2009, G. de Silva Wijeyeratne; 25-v-2009, K. Conniff ● Talangama, Hokandara Ditch; Colombo Distr.; N6.8791, E79.9483; 25-v-2009, M. Bedjanič; 27-v-2007, N. & M. van der Poorten & K. Conniff ● Talangama, irrigation canal east of Talangama Tank; Colombo Distr.; N6.8882, E79.9525; 27-v-2005, K. Conniff; 30-vi-2005, K. Conniff ● Kithulgala, Kelani river near the bridge; Kegalle Distr.; N6.9894, E80.4189; 22-v-2009, M. Bedjanič ● Kitulgala; Kegalle Distr.; N7.0011, E80.4001; 19-iii-2008, S. Hettiarachchi ● Sinharaja Forest Biosphere Reserve; Ratnapura Distr.; N6.4087, E80.4447; WCSG (2009) ● Uggalkaltotta, stream beside the road W of Kalthota junction; Ratnapura Distr.; N6.6511, E80.8795; 3-xi-2012, M. Bedjanič ● Uggalkaltotta; Ratnapura Distr.; N6.6522, E80.8807; 10-x-1970, O.S. Flint, M.A. Lieftinck unpubl. corresp. ● Elpitiya, forest reserve 6km SE of Elpitiya; Galle Distr.; N6.2654, E80.2054; WCSG (2008) ● Hiyare Forest Reserve; Galle Distr.; N6.0708, E80.3203; 7-ii-2007, K. Conniff ● Hiyare Lake; Galle Distr.; N6.0586, E80.3165; WCSG (2008) ● Kanneliya; Galle Distr.; N6.2455, E80.3544; WCSG (2008) ● Kottawa, Kottawa Forest Reserve; Galle Distr.; N6.1116, E80.3145; 11-iii-1972, K.V. Krombein & P.B. Karunaratne, NMNH - Smithsonian Institution; WCSG (2008) ● Maduganga lagoon near village Maduwa; Galle Distr.; N6.2982, E80.056; WCSG (2008) ● Nakiyadeniya, forest reserve 1km N of Udagama Central; Galle Distr.; N6.1755, E80.385; WCSG (2008) ● Ambalantota, jungle next to the Walawe River north of Ambalantota; Hambantota Distr.; N6.1312, E81.0216; 15-ix-2007, K. Conniff ● Dandeniya; Matara Distr.; N6.0159, E80.6334; WCSG (2009) ● Dediya; Matara Distr.; N6.1893, E80.4277; WCSG (2009) ● Deniyaya, Gin Ganga river 1km downstream of Deniyaya; Matara Distr.; N6.3525, E80.5668; 20-vii-2012, M. Bedjanič ● Deniyaya, Gin Ganga River 500m upstream of Deniyaya village; Matara Distr.; N6.3441, E80.555; 5-xi-2001, M. Bedjanič & A. Šalamun ● Panilkanda; Matara Distr.; N6.3489, E80.6524; WCSG (2009)

Microgomphus wijaya

Haragama, tributary of Mahaweliganga, near Mailapitya; Kandy Distr.; N7.2253, E80.744; 17-ix-1938, M.A. Lieftinck: LIEFTINCK (1940) ● Haragama; Kandy Distr.; N7.2478, E80.7203; 29-xii-1953, F. Keiser: LIEFTINCK (1955) ● Ras Ella Falls near Wategama; Kandy Distr.; N7.3517, E80.6802; 21-x-2001, M. Bedjanič & A. Šalamun ● Rathna Ella Falls, irrigation channel 1km SSE of Rathna Ella Falls; Kandy Distr.; N7.3693, E80.9277; 20-x-2001, M. Bedjanič & A. Šalamun ● Talatu Oya Rivulet 2km S of the Kandy-Haragama road; Kandy Distr.; N7.2513, E80.6882; 17-x-2001, M. Bedjanič & A. Šalamun ● Hunas Falls, golf course with surroundings; Matale Distr.; N7.4026, E80.6919; 2-v-2006, H.-U. Kohler ● Athwelthota, river at Athwelthota village, near Morapitiya turn-off; Kalutara Distr.; N6.5446, E80.283; 14-v-2009, M. Bedjanič ● Kitulgala; Kegalle Distr.; N7.0011, E80.4001; 2-iv-2012, D. Randula ● Mahabage, Ing Oya; Kegalle Distr.; N7.0068, E80.428; 7-x-2009, K. Conniff ● Pinnawalla, stream at the road Kegalle-Pinnawella, 1km N of the road Kegalle-Kandy; Kegalle Distr.; N7.259, E80.378; 5-vii-2012, M. Bedjanič ● Ayagama, river past Ayagama at the Idangoda-Kalawana road; Ratnapura Distr.; N6.6446, E80.3138; 12-v-2009, M. Bedjanič ● Ratnapura, Kalu Ganga before the town of Ratnapura; Ratnapura Distr.; N6.6971, E80.4249; 20-xi-1970, H.H. Costa & F. Starmühlner: ST. QUENTIN (1973) ● Ratnapura, Panamure, Hulanda Oya; Ratnapura Distr.; N6.3471, E80.7705; 16-x-1970, O.S. Flint, M.A. Lieftinck unpubl. corresp. ● Upper reaches of Kalu Ganga at Malwala; Ratnapura Distr.; N6.7071, E80.434; 21-xi-1970, H.H. Costa & F. Starmühlner: ST. QUENTIN (1973) ● Sinharaja, main path from the entrance to Sinharaja Forest Biosphere Reserve to the Kakuna Falls on Aranuwa Dola Rivulet; Galle Distr.; N6.3662, E80.4755; 2-v-2003, M. Bedjanič ● Urala, Rivulet under the bridge in Urala village; Galle Distr.; N6.1493, E80.2718; 14-v-2009, M. Bedjanič ● Deniyaya, Gin Ganga River 500m upstream of Deniyaya village; Matara Distr.; N6.3441, E80.555; 5-xi-2001, M. Bedjanič & A. Šalamun ● Kirilipana; Matara Distr.; N6.2961, E80.5769; 8-xii-2011, A. Sumanapala ● Pitabeddara, left tributary of Nilwala River; Matara Distr.; N6.1904, E80.4758; 16-v-2009, M. Bedjanič ● Sinharaja, right tributary of Gin Ganga at Elawatta Tea Factory; Matara Distr.; N6.3696, E80.5945; 30-iv-2003, M. Bedjanič ● Diyuluma Falls – up and downstream of the bridge; Badulla Distr.; N6.7201, E81.0252; 25-iv-2003, M. Bedjanič

Paragomphus campestris

Wilpattu National Park, Kokmotte Bungalow; Puttalam Distr.; N8.5278, E80.0275; 23-v-1976, K.V. Krombein, P.B. Karunaratne et al.: BEDJANIČ (2013a) ● Minneriya; Polonnaruwa Distr.; N8.125, E80.8908; 1-viii-2011, : BEDJANIČ (2013a); 9-vi-2011, : BEDJANIČ (2013a) ● Mawanella, Hingula Oya; Kegalle Distr.; N7.2487, E80.4648; 22-iv-1976, G. von Rosen, ZSM München: BEDJANIČ (2013a) ● Mahiyangana, Mahaweli Ganga 300m N of the bridge; Badulla Distr.; N7.3406, E80.9851; 29-x-2012, M. Bedjanič: BEDJANIČ (2013a) ● Mahiyangana, Mahaweli Ganga at New Rest House; Badulla Distr.; N7.3358, E80.9885; 10-vii-2012, M. Bedjanič ● Inginiyagala, Gal Oya - small rivulet 12km SE of Bulupitiya, before the inflow into the Senanayake Samudra Lake, Nilgala, Gal Oya National Park; Monaragalla Distr.; N7.1898, E81.4211; 8-iii-2010, K. Conniff: BEDJANIČ (2013a) ● Maha Oya, river under the bridge on the road Batticaloa-Mahiyangana; Ampara Distr.; N7.5381, E81.3657; 10-vii-2012, M. Bedjanič: BEDJANIČ (2013a)

Megalogomphus ceylonicus

Guruluputha, stream and adjacent paddy fields in the village Guruluputha; Kandy Distr.; N7.3415, E80.9249; 20-x-2001, M. Bedjanič & A. Šalamun ● Halgolla, 50 acres; Kandy Distr.; N7.3685, E80.527; 22-iv-2011, N. & M. van der Poorten; 28-iv-2011, N. & M. van der Poorten ● Randenigala, stream at the road 2km NE of Randenigala Dam; Kandy Distr.; N7.21, E80.9418; 11-vii-2012, M. Bedjanič ● Rathna Ella Falls, irrigation channel 1km SSE of Rathna Ella Falls; Kandy Distr.; N7.3693, E80.9277; 20-x-2001, M. Bedjanič & A. Šalamun ● Rathna Ella Falls; Kandy Distr.; N7.3719, E80.9235; 20-x-2001, M. Bedjanič & A. Šalamun ● Nalande; Matale Distr.; N7.6495, E80.6374; 16-x-1924, F. Wall: FRASER (1933d) ● Labugama, small stream near the temple in Labugama; Colombo Distr.; N6.8472, E80.1725; 12-v-2009, M. Bedjanič ● Labugama, stream at the road to Kalutawa reservoir near Labugama; Colombo Distr.; N6.8378, E80.1623; 12-v-2009, M. Bedjanič ● Athwelthota, river at Athwelthota village, near Morapitiya turn-off; Kalutara Distr.; N6.5446, E80.283; 14-v-2009, M. Bedjanič ● Mahabage, stream in rubber estate; Kegalle Distr.; N7.0083, E80.4437; 31-v-2007, N. & M. van der Poorten & K. Conniff; 29-iv-2007, N. & M. van der Poorten ● Balangoda; Ratnapura Distr.; N6.6418, E80.6814; "April 1926", W.F. Yerbury: LAIDLAW (1922) ● Belihul Oya, left tributary to Belihul Oya 700m N of the road to Haputale; Ratnapura Distr.; N6.7241, E80.7669; 18-v-2009, M. Bedjanič ● Bopathella Falls near Ratnapura; Ratnapura Distr.; N6.803, E80.3729; 17-xi-1970, H.H. Costa & F. Starmühlner: ST. QUENTIN (1973) ● Ratnapura; Ratnapura Distr.; N6.678, E80.3993; 10-vi-2011, J. Gunathilake ● Sinharaja Forest Biosphere Reserve; Ratnapura Distr.; N6.4087, E80.4447; 10-vi-2009, K. Conniff; 5-x-2009, K. Conniff ● Upper reaches of Kalu Ganga at Malwala; Ratnapura Distr.; N6.7071, E80.434; 21-xi-1970, H.H. Costa & F. Starmühlner: ST. QUENTIN (1973) ● Haycock, stream in Haycock range; Galle Distr.; N6.3335, E80.3112; 15-v-2009, M. Bedjanič ● Haycock, stream on the way to Haycock; Galle Distr.; N6.3422, E80.3236; 15-v-2009, M. Bedjanič ● Sinharaja, main path from the entrance to Sinharaja Forest Biosphere Reserve to the Kakuna Falls on Aranuwa Dola Rivulet; Galle Distr.; N6.3662, E80.4755; 29-iv-2003, M. Bedjanič ● Pitabeddara, left tributary of Nilwala River; Matara Distr.; N6.1904, E80.4758; 16-v-2009, M. Bedjanič ● Wellawaya, river 10km N of Wellawaya; Badulla Distr.; N6.8247, E81.0909; 11-x-2010, K. Conniff ● Wellawaya, Kadapola Oya W of Wellawaya; Moneragala Distr.; N6.7337, E81.1094; 17-iv-1976, G. von Rosen, ZSM Munich

Gomphidia pearsoni

Gampola, Atabage Oya 6km out of Gampola; Kandy Distr.; N7.1141, E80.5982; 20-iv-2003, M. Bedjanič ● Rathna Ella Falls; Kandy Distr.; N7.3719, E80.9235; 20-x-2001, M. Bedjanič & A. Šalamun ● Samadhi Centre; Kandy Distr.; N7.3624, E80.7351; 10-i-2010, K. Conniff ● Talatu Oya Rivulet 2km S of the Kandy-Haragama road; Kandy Distr.; N7.2513, E80.6882; 17-x-2001, M. Bedjanič & A. Šalamun ● Nalande; Matale Distr.; N7.6495, E80.6374; 16-x-1974, NHM London ● Athwelthota, river at Athwelthota village, near Morapitiya turn-off; Kalutara Distr.; N6.5446, E80.283; 14-v-2009, M. Bedjanič ● Athwelthota; Kalutara Distr.; N6.5389, E80.2891; 20-x-2012, A. Sumanapala ● Galapitigama, small shady stream 12km SE of Warakapola; Kegalle Distr.; N7.135, E80.2645; 15-i-2013, N. & M. van der Poorten ● Kithulgala, Makandawa rainforest; Kegalle Distr.; N6.9917, E80.4048; 10-xi-2012, M. Bedjanič; 27-xii-2012, A. Sumanapala ● Kitulgala, hotel, Ing Oya River; Kegalle Distr.; N6.9863, E80.3935; 14-x-2007, D. Smallshire & K. Conniff ● Kitulgala, Kelani Valley Forest Reserve; Kegalle Distr.; N6.9903, E80.3926; 22-ix-2012, A. Sumanapala ● Kitulgala; Kegalle Distr.; N7.0011, E80.4001; 4-x-2008, W. Wikramasekara ● Mahabage, Ing Oya; Kegalle Distr.; N7.0068, E80.428; 14-x-2010, K. Conniff ● Mahabage, stream in rubber estate; Kegalle Distr.; N7.0083, E80.4437; 29-iv-2007, N. & M. van der Poorten ● Mahabage; Kegalle Distr.; N7.0169, E80.4384; 7-x-2008, K. Conniff; 31-v-2008, K. Conniff ● Sinharaja, pond at the new visitors centre; Ratnapura Distr.; N6.4356, E80.419; 14-v-2009, M. Bedjanič ● Sinharaja, streams near research station; Ratnapura Distr.; N6.4164, E80.4236; 13-v-2009, M. Bedjanič ● Uggalkaltota; Ratnapura Distr.; N6.6522, E80.8807; 10-x-1970, O.S. Flint, M.A. Lieftinck unpubl. corresp. ● Kanneliya Reserve, small stream near the entrance; Galle Distr.; N6.2509, E80.3381; 7-v-2012, A. Sumanapala ● Sinharaja, Gin Ganga River at Pitadeniya Forest Camp in Sinharaja Forest Biosphere Reserve; Galle Distr.; N6.3694, E80.4591; 4-xi-2001, M. Bedjanič & A. Šalamun ● Sinharaja, main path from the entrance to Sinharaja Forest Biosphere Reserve to the Kakuna Falls on Aranuwa Dola Rivulet; Galle Distr.; N6.3662, E80.4755; 2-v-2003, M. Bedjanič ● Deniyaya, Gin Ganga river 1km downstream of Deniyaya; Matara Distr.; N6.3525, E80.5668; 20-vii-2012, M. Bedjanič ● Deniyaya, Gin Ganga River 2.5km downstream of Deniyaya village; Matara Distr.; N6.3531, E80.579; 3-xii-2004, S. Weltd ● Deniyaya, Gin Ganga River 500m upstream of Deniyaya village; Matara Distr.; N6.3441, E80.555; 5-xi-2001, M. Bedjanič & A. Šalamun ● Sinharaja, right tributary of Gin Ganga at Elawatta Tea Factory; Matara Distr.; N6.3696, E80.5945; 30-iv-2003, M. Bedjanič ● Belihul Oya, 8km above Belihul Oya; Badulla Distr.; N6.7492, E80.8361; 10-v-1932, F.C. Fraser: FRASER (1933d) ● Diyaluma Falls, small stream in the rubber plantation and

the main stream 700m S of Diyaluma Falls; Badulla Distr.; N6.7209, E81.0261; 25-iv-2003, M. Bedjanič ● Bibile, Gal Oya; Moneragala Distr.; N7.1564, E81.2183; 22-vii-1929, G.M. Henry: FRASER (1933d)

Macromia flinti

Uggalkaltota; Ratnapura Distr.; N6.6522, E80.8807; 10-x-1970, O.S. Flint: LIEFTINCK (1977)

Macromia zeylanica

Gampola, Galgede Oya, 2.4km N of Gampola; Kandy Distr.; N7.1873, E80.5734; 22-iv-1970, O.S. Flint: LIEFTINCK (1977) ● Haragama, tributary of Mahaweliganga, near Mailapitiya; Kandy Distr.; N7.2253, E80.744; 17-ix-1938, M.A. Lieftinck: LIEFTINCK (1940) ● Kandy; Kandy Distr.; N7.296, E80.6376; "1970", O.S. Flint, M.A. Lieftinck unpubl. corresp.; 13-ix-1924, F. Wall: FRASER (1927) ● Talatu Oya Rivulet 2km S of the Kandy-Haragama road; Kandy Distr.; N7.2513, E80.6882; 17-x-2001, M. Bedjanič & A. Šalamun ● Giniganthena, stream 1.3km NNW of Giniganthena along the road to Nawalapitiya; Nuwara Eliya Distr.; N7.0004, E80.4907; 13-vii-2012, M. Bedjanič ● Morapitiya Forest Reserve, small stream; Kalutara Distr.; N6.5335, E80.2911; 11-iii-2010, K. Conniff ● Morapitiya; Kalutara Distr.; N6.5361, E80.2627; VAN DER POORTEN & CONNIF (2012) ● Hettimulla, stream at the roadside in Hettimulla 7km SE of Kegalle; Kegalle Distr.; N7.2003, E80.3711; 5-vii-2012, M. Bedjanič ● Mawanella; Kegalle Distr.; N7.2507, E80.443; 2-ix-2012, S. Hewapathirana ● Pinnawalla, stream at the road Kegalle-Pinnawalla, 1km N of the road Kegalle-Kandy; Kegalle Distr.; N7.259, E80.378; 5-vii-2012, M. Bedjanič ● Belihul Oya; Ratnapura Distr.; N6.7152, E80.7673; 7-xii-1970, H.H. Costa & F. Starmühlner ● Sinharaja, Kakuna Falls on Aranuwa Dola Rivulet in Sinharaja Forest Biosphere Reserve; Ratnapura Distr.; N6.3821, E80.4789; 4-xi-2001, M. Bedjanič & A. Šalamun ● Uggalkaltota; Ratnapura Distr.; N6.6522, E80.8807; 10-x-1970, O.S. Flint: LIEFTINCK (1977) ● Upper Uda Walawe River Basin near Belihul Oya; Ratnapura Distr.; N6.675, E80.8001; 1-vi-2000, K. Conniff ● Sinharaja, main path from the entrance to Sinharaja Forest Biosphere Reserve to the Kakuna Falls on Aranuwa Dola Rivulet; Galle Distr.; N6.3662, E80.4755; 19-vii-2012, M. Bedjanič ● Deniyaya, Gin Ganga River 2.5km downstream of Deniyaya village; Matara Distr.; N6.3531, E80.579; 30-iv-2003, M. Bedjanič ● Deniyaya, Gin Ganga River 500m upstream of Deniyaya village; Matara Distr.; N6.3441, E80.555; 4-iii-2011, K. Conniff & S. Gunasinghe ● Deniyaya, Thanipita-Dola, torrent running through forest and tea-plantations; Matara Distr.; N6.3292, E80.5716; 12-xi-1970, H.H. Costa & F. Starmühlner: ST. QUENTIN (1973) ● Ella; Badulla Distr.; N6.8773, E81.0463; 5-vi-1975, D.H. Messersmith, G.L. Williams & P.B. Karunaratne, NMNH - Smithsonian Institution ● Kuda-Oya, near Buttala in the Southeast of Ceylon, running through forest and very shady; Moneragala Distr.; N6.8307, E81.3; 9-xii-1970, H.H. Costa & F. Starmühlner: ST. QUENTIN (1973)

Macromidia donaldi pethiyagodai

Kithulgala, Plantation Hotel at Kelani River in Kithulgala; Kegalle Distr.; N6.9935, E80.4178; 28-vii-2009, M. Bedjanič ● Kalawana; Ratnapura Distr.; N6.5364, E80.3994; 5-vii-2007, N. & M. van der Poorten ● Ratnapura, right tributary of Kalu Ganga at NW outskirts of Ratnapura; Ratnapura Distr.; N6.6855, E80.3944; 4-v-2003, M. Bedjanič ● Sinharaja Rainforest along the main trail leading to research camp; Ratnapura Distr.; N6.4196, E80.4196; 2-vii-2007, N. & M. van der Poorten ● Sinharaja, near Kudawe; Ratnapura Distr.; N6.26, E80.25; 17-iv-2007, N. van der Poorten: VAN DER POORTEN (2012); 3-vii-2007, N. van der Poorten: VAN DER POORTEN (2012) ● Sinharaja, main path from the entrance to Sinharaja Forest Biosphere Reserve to the Kakuna Falls on Aranuwa Dola Rivulet; Galle Distr.; N6.3662, E80.4755; 2-v-2003, M. Bedjanič ● Diyaluma Falls – up and downstream of the bridge; Badulla Distr.; N6.7201, E81.0252; 26-x-2001, M. Bedjanič & A. Šalamun ● Diyaluma Falls, small stream in the rubber plantation and the main stream 700m S of Diyaluma Falls; Badulla Distr.; N6.7209, E81.0261; 26-x-2001, M. Bedjanič & A. Šalamun

Hylaeothemis fruhstorferi

Belihul Oya; Ratnapura Distr.; N6.7152, E80.7673; KARSCH (1889a); "May 1932", F.C. Fraser: FRASER (1936); ● Sinharaja Forest Biosphere Reserve; Ratnapura Distr.; N6.4087, E80.4447; 5-viii-2007, K. Conniff; 6-x-2008, K. Conniff; 7-x-2010, K. Conniff; 15-vii-2010, S. Yeomans; 14-vi-2006, G. de Silva Wijeyeratne; 13-x-2011, D. Randula; 28-ix-2004, A. Salgado ● Sinharaja Rainforest along the main trail leading to research camp; Ratnapura Distr.; N6.4196, E80.4196; 13-v-2007, N. & M. van der Poorten; 14-iv-2008, N. & M. van der Poorten; 14-vii-2006, A. Salgado; 20-vi-2007, N. & M. van der Poorten; 25-vii-2008, A. Salgado; 2-vii-2007, N. & M. van der Poorten; 8-vii-2008, A. Salgado ● Sinharaja, Martin's and core reserve; Ratnapura Distr.; N6.4201, E80.4153; 12-x-2007, D. Smallshire & K. Conniff ● Sinharaja, Martin's Forest Lodge; Ratnapura Distr.; N6.428, E80.4124; 4-x-2008, K. Conniff ● Sinharaja, stony stream 700m from the entrance on the way to new entrance gate; Ratnapura Distr.; N6.4297, E80.4163; 13-v-2009, M. Bedjanič ● Sinharaja, stream along the road from Martin's to the new visitors centre; Ratnapura Distr.; N6.4315, E80.4152; 14-v-2009, M. Bedjanič ● Sinharaja, water tank near path to hill top; Ratnapura Distr.; N6.4101, E80.421; 10-v-2006, K. Conniff

Tetrathemis yerburii

4.8km NW of Hanguranketa, 16km SE of Kandy; Kandy Distr.; N7.2133, E80.7404; 15-iii-1962, P. Brinck, H. Andersson & L. Cederholm: LIEFTINCK (1971a) ● Digana, Daya's Place; Kandy Distr.; N7.336, E80.7128; 11-v-2011, N. & M. van der Poorten ● Kandy, Udawatakelle Sanctuary; Kandy Distr.; N7.3011, E80.6397; 29-v-1976, K.V. Krombein et al., NMNH - Smithsonian Institution ● Kandy; Kandy Distr.; N7.296, E80.6376; 3-ix-1924, F. Wall, NHM London; 31-v-1892, W.F. Yerbury: KIRBY (1894); 30-vi-1892, W.F. Yerbury: KIRBY (1894); 14-x-1924, F. Wall, NHM London; 11-xii-1930, NHM London ● Peradeniya Botanic Gardens; Kandy Distr.; N7.2708, E80.5934; 7-v-2006, H.-U. Kohler ● Samadhi Centre; Kandy Distr.; N7.3624, E80.7351; 10-i-2010, K. Conniff ● Hunas Falls, golf course with surroundings; Matale Distr.; N7.4026, E80.6919; 2-v-2006, H.-U. Kohler ● Hunas Falls, Simpson's Forest; Matale Distr.; N7.3948, E80.6945; 18-x-2007, D. Smallshire & K. Conniff ● Hunas Falls; Matale Distr.; N7.4037, E80.6899; 10-x-2008, W. Wikramasekara; 11-x-2009, K. Conniff; 16-x-2010, K. Conniff ● Hunnas Falls Hotel, lake; Matale Distr.; N7.4012, E80.6914; 8-x-2009, K. Conniff; 11-x-2008, K. Conniff ● Hatton; Nuwara Eliya Distr.; N6.8952, E80.5938; "May 1911", E.E. Green: LAIDLAW (1924) ● Laxapana, NW of Laxapana; Nuwara Eliya Distr.; N6.9362, E80.4757; 25-ix-1970, O.S. Flint, M.A. Lieftinck unpubl. corresp. ● Horagolla, lowland rain forest patch; Gampaha Distr.; N7.1401, E80.0849; 15-viii-2011, B. Kalhara ● Pilikuttuwa Raja Maha Viharaya; Gampaha Distr.; N7.065, E80.0508; 21-vii-2012, A. Sumanapala ● Bodhinagala, Dombagaskanda Forest Reserve – small stream; Kalutara Distr.; N6.7265, E80.1518; 17-vi-2012, A. Sumanapala ● Bodhinagala, Ingiriya Forest Reserve, about 30km SE of Colombo; Kalutara Distr.; N6.7541, E80.1538; 11-vi-2008, K. Conniff; 22-i-2010, G. de Silva Wijeyeratne ● Bodhinagala, path to the temple; Kalutara Distr.; N6.7651, E80.1496; 9-ii-2007, N. & M. van der Poorten; 12-vi-2008, G. de Silva Wijeyeratne; 2-v-2011, K. Conniff & H.M. Lankika; 8-vi-2006, N. & M. van der Poorten ● Morapitiya Forest Reserve, small stream; Kalutara Distr.; N6.5335, E80.2911; 27-iv-2006, N. & M. van der Poorten ● Galapitigama, small shady stream 12km SE of Warakapola; Kegalle Distr.; N7.135, E80.2645; 15-i-2013, N. & M. van der Poorten ● Kithulgala, stream among plantations on the way to the forest; Kegalle Distr.; N6.9863, E80.4142; 21-v-2009, M. Bedjanič ● Kitulgala, Kelani Valley Forest Reserve; Kegalle Distr.; N6.9903, E80.3926; 21-x-2004, A. Salgado ● Mahabage, river near Royal River Resort hotel; Kegalle Distr.; N7.0159, E80.4303; 2-ii-2007, N. & M. van der Poorten & K. Conniff ● Mahabage; Kegalle Distr.; N7.0169, E80.4384; 6-iii-2007, K. Conniff ● Mawanella, murky pond surrounded by low vegetation; Kegalle Distr.; N7.2535, E80.4421; 20-ix-2004, A. Salgado ● Balangoda, muddy spring on the road Balangoda-Rassagala, 4km NW of Balangoda; Ratnapura Distr.; N6.674, E80.6765; 16-vii-2012, M. Bedjanič ● Balangoda, stream at the road Balangoda-Ratnapura 4km SW of Balangoda; Ratnapura Distr.; N6.6293, E80.6724; 18-vii-2012, M. Bedjanič ● Belihul Oya, left tributary of Belihul Oya near rice fields and Belihul Oya village; Ratnapura Distr.; N6.7213, E80.7721; 18-v-2009, M. Bedjanič ● Bowathta, stream at the road Balangoda-Ugalkaltotta, 7.5km SE of Balangoda; Ratnapura Distr.; N6.6204, E80.7579; 17-vii-2012, M. Bedjanič ● Kalatuwawa Reservoir; Ratnapura Distr.; N6.8558, E80.2037; 19-ix-1970, O.S. Flint, M.A. Lieftinck unpubl. corresp. ● Sinharaja Forest Biosphere Reserve; Ratnapura Distr.; N6.4087, E80.4447; 5-x-2008, K. Conniff ● Sinharaja, Kakuna Falls on Aranuwa Dola Rivulet in Sinharaja Forest Biosphere Reserve; Ratnapura Distr.; N6.3821, E80.4789; 4-xi-2001, M. Bedjanič & A. Šalamun ● Sinharaja, Martin's and core reserve; Ratnapura Distr.; N6.4201, E80.4153; 15-iii-2007, G. de Silva Wijeyeratne ● Ugalkaltotta, small stream beside the road to Welioya, 400m SE of Kalthota junction; Ratnapura Distr.; N6.665, E80.8896; 17-vii-2012, M. Bedjanič; 3-xi-2012, M. Bedjanič ● Sinharaja, main path from the entrance to Sinharaja Forest Biosphere Reserve to the Kakuna Falls on Aranuwa Dola Rivulet; Galle Distr.; N6.3662, E80.4755; 29-iv-2003, M. Bedjanič ● Sinharaja, small pool beside the road outside the reserve, near waterfall; Galle Distr.; N6.371, E80.478; 19-vii-2012, M. Bedjanič ● Deniyaya, small water reservoir 300m W of Gin Ganga river, 1km NE of Deniyaya; Matara Distr.; N6.3519, E80.5645; 20-vii-2012, M. Bedjanič ● Kirilipana; Matara Distr.; N6.2961, E80.5769; 8-xii-2011, A. Sumanapala ● Wilpita, small stream at the road near Wilpita, 6km ESE of Akuressa; Matara Distr.; N6.0851, E80.5293; 16-v-2009, M. Bedjanič

Lyriothemis defonseikai

Sinharaja Forest Reserve, 2km from the Kudawe entry point, near the stream beside the Research Station; Ratnapura Distr.; N6.419; 2-v-2007, S. Gunasinghe: VAN DER POORTEN (2009b) ● Sinharaja, at the Kudawe entry point, 100m from the entrance gate; Ratnapura Distr.; N6.4285, E80.4151; 12-v-2009, K. Conniff: VAN DER POORTEN (2009b); 7-x-2007, K. Conniff: VAN DER POORTEN (2009b) ● Sinharaja, at the Kudawe entry point, 2km from the entrance gate, near the Research Station; Ratnapura Distr.; N6.4149, E80.4248; 14-vii-2006, A. Salgado: VAN DER POORTEN (2009b); 14-viii-2007, A. Salgado: VAN DER POORTEN (2009b) ● Sinharaja, at the Kudawe entry point, 400m from the entrance gate, near the start of the Moulawella Nature Trail; Ratnapura Distr.; N6.426, E80.4164; 30-ix-2008, G. de Silva Wijeyeratne: VAN DER POORTEN (2009b); 14-iv-2008, N. & M. van der Poorten; 8-ix-2007, K. Conniff & G. van der Poorten: VAN DER POORTEN (2009b); 9-ix-2007, K. Conniff & G. van der Poorten: VAN DER POORTEN (2009b); 6-viii-2008, A. Salgado: VAN DER POORTEN (2009b); 4-v-2008, N. & M. van der Poorten: VAN DER POORTEN (2009b); 2-vii-2007, N. & M. van der Poorten; 25-vii-2007, G. de Silva Wijeyeratne: VAN DER POORTEN (2009b); 21-vii-2005, M. Wijewardana; 20-vi-2007, N. & M. van der Poorten; 14-xi-2008, G. de Silva Wijeyeratne; 17-iv-2008, N. & G. van der Poorten: VAN DER POORTEN (2009b) ● Sinharaja, near Kudawe; Ratnapura Distr.; N6.26, E80.25; 18-vi-2007, N. van der Poorten: VAN DER POORTEN (2009a); 3-vii-2007, N. van der Poorten: VAN DER POORTEN (2009a) ● Sinharaja, stream and pool half way from entrance to Research Station; Ratnapura Distr.; N6.4236, E80.4169; 13-v-2009, M. Bedjanič

Appendix 3

PHOTOGRAPHIC INDEX AND SUPPLEMENTARY MATERIAL

Dragonfly photography is a challenging task, requiring patience plus a lot of experience and knowledge too. Although the present book is not aimed as a photographic or identification guide to the dragonflies of Sri Lanka, the photography forms a substantial and important part of the whole.

Due to limitation of space the huge amount of available photographic material gathered over the years could not be included, but throughout the book, if available, almost all species are presented by photographs taken in nature. In this appendix the species name, sex, additional notes and the photographer's name are listed for all photos, systematically by chapters. In this way it is possible to track every photo in the book, including the ones without any captions, as is the case in the family introduction pages of CHAPTER 6.

While for endemic species, the photographs of both sexes are already included in the species accounts, this appendix adds additional photographs

of the more widespread non-endemic species of the Coenagrionidae and Libellulidae. This mainly includes females, but also differently coloured age stages of certain species. In some of them, such as *Agriocnemis pygmaea* and *Ischnura senegalensis* or in the representatives of the genus *Orthetrum*, it has been impossible to resist the temptation and more photos were selected in order to depict the diversity of colouration outlooks in males and females.

In past years, many excellent Sri Lankan photographers, especially Gehan de Silva Wijeyeratne and Amila Salgado, have sent their photographs for determination and have helped herewith in improving the knowledge and experience of all involved. Apart from the authors, George van der Poorten, Indeevara Jayalath, C. Bijoy, Gehan de Silva Wijeyeratne, Allan Brandon and Jerry Louton contributed the photographs and have thus helped in completing the book.

- **Front cover** – *Pseudagrion rubriceps ceylonicum*, male (K. Conniff); inside (paperback only): *Tetrathemis yerburii*, male (M. Bedjanič); *Libellago greeni*, male (M. Bedjanič)
- **Back cover** – habitat (M. Bedjanič); inside (paperback only): *Drepanosticta nietneri*, male (M. Bedjanič); *Paragomphus henryi*, male (M. Bedjanič)
- **Introduction** – p. 2: habitat (M. Bedjanič); p. 9: *Libellago adami*, male (M. Bedjanič);
- **Chapter 1** – p. 12: habitat (M. Bedjanič); p. 13: habitat (M. Bedjanič)
- **Chapter 2** – p. 16, left: *Pseudagrion rubriceps ceylonicum*, tandem (M. Bedjanič); p. 16, right: *Rhyothemis triangularis*, tandem (M. Bedjanič); p. 17, top, middle, bottom: *Burmagomphus pyramidalis sinuatus*, emergence (M. Bedjanič); p. 19: *Drepanosticta hilaris*, male (M. Bedjanič);
- **Chapter 3** – p. 21: habitat (M. Bedjanič); p. 22, left: habitat (K. Conniff); p. 22, right: habitat (M. Bedjanič); p. 23: habitat (M. Bedjanič), p. 24: habitat (M. Bedjanič);

CALOPTERYGIDAE

FAMILY INTRODUCTION PAGES - p. 46: habitat (M. Bedjanič); p. 47, top: *Neurobasis chinensis chinensis*, male (M. Bedjanič); upper small: *Vestalis apicalis nigrescens*, male (M. Bedjanič); middle small: *Neurobasis chinensis chinensis*, female (K. Conniff); right small: *Vestalis apicalis nigrescens*, male (M. Bedjanič); p. 48: habitat (M. Bedjanič);

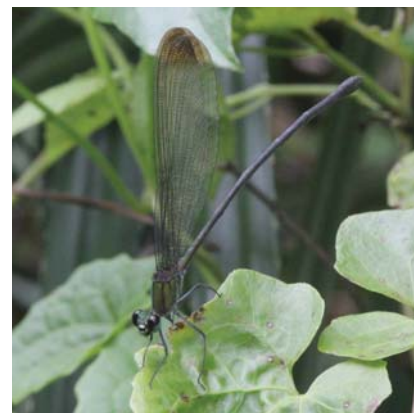
SPECIES ACCOUNTS –p. 49: *Neurobasis chinensis chinensis*, male (M. Bedjanič); p. 50 upper: *Vestalis apicalis nigrescens*, male (K. Conniff); p. 50, lower: *Vestalis apicalis nigrescens*, female (K. Conniff);



Neurobasis chinensis chinensis, female
(G. van der Poorten)



Vestalis apicalis nigrescens, young male,
with clear wing tips (M. Bedjanič)



Vestalis apicalis nigrescens, old female,
with brownish wing tips (M. Bedjanič)

CHLOROCYPHIDAE

FAMILY INTRODUCTION PAGES - p. 52: habitat (M. Bedjanič); p. 53, top: *Libellago corbeti*, young male (G. van der Poorten); upper small: *Libellago finalis*, male (M. Bedjanič); middle small: *Libellago greeni*, female (M. Bedjanič); lower small: *Libellago greeni*, male (M. Bedjanič);

SPECIES ACCOUNTS –p. 54, upper: *Libellago adami*, male (G. van der Poorten); p. 54, lower: *Libellago adami*, young female (G. van der Poorten); p. 56, upper: *Libellago corbeti*, male (G. van der Poorten); p. 56, lower: *Libellago corbeti*, ovipositing female (G. van der Poorten); p. 58, upper: *Libellago finalis*, male (G. van der Poorten); p. 58, lower: *Libellago finalis*, female (M. Bedjanič); p. 60, upper: *Libellago greeni*, male (G. van der Poorten); p. 60, lower: *Libellago finalis*, female (G. van der Poorten);



Libellago adami, young male with clear
wing tips (G. van der Poorten)



Libellago adami, old female (M. Bedjanič)



Libellago finalis, male (M. Bedjanič)

EUPHAEIDAE

FAMILY INTRODUCTION PAGES - p. 62: habitat (M. Bedjanič); p. 63, top: *Euphaea splendens*, mating wheel - copulation (K. Conniff); upper small: *Euphaea splendens*, female (M. Bedjanič); middle small: *Euphaea splendens*, exuvia (M. Bedjanič); lower small: *Euphaea splendens*, old male (M. Bedjanič);

SPECIES ACCOUNT —p. 64, upper: *Euphaea splendens*, male (M. Bedjanič); p. 64, lower: *Euphaea splendens*, female (M. Bedjanič);

LESTIDAE

FAMILY INTRODUCTION PAGES - p. 66: habitat (M. Bedjanič); p. 67, top: *Indolestes gracilis gracilis*, male (M. Bedjanič); upper small: *Lestes praemorsus decipiens*, oviposition in tandem (G. van der Poorten); middle small: *Sinhalestes orientalis*, male (M. Bedjanič); lower small: *Lestes elatus*, female (G. van der Poorten); p. 68: habitat (K. Conniff);

SPECIES ACCOUNTS —p. 69: *Lestes elatus*, male (G. van der Poorten); p. 70: *Lestes malabaricus*, male, India (C. Bijoy); p. 71: *Lestes praemorsus decipiens*, male and female in tandem (G. van der Poorten); p. 72, upper: *Sinhalestes orientalis*, male (M. Bedjanič); p. 72, lower: *Sinhalestes orientalis*, female (I. Jayalath); p. 74, upper: *Indolestes divisus*, oviposition in tandem, disturbed by second male (K. Conniff); p. 74, lower: *Indolestes divisus*, male (K. Conniff); p. 76, upper: *Indolestes gracilis gracilis*, oviposition in tandem (K. Conniff); p. 76, lower: *Indolestes gracilis gracilis*, male (K. Conniff);



Lestes elatus, old male
(G. van der Poorten)



Lestes praemorsus decipiens,
male (G. van der Poorten)



Sinhalestes orientalis, male
(M. Bedjanič)



Indolestes divisus, male and
female in tandem (K. Conniff)

COENAGRIONIDAE

FAMILY INTRODUCTION PAGES - p. 78: habitat (M. Bedjanič); p. 79, top: *Mortonagrion ceylonicum*, mating wheel - copulation (K. Conniff); upper small: *Ischnura aurora rubilio*, male and female in tandem (M. Bedjanič); middle small: *Pseudagrion malabaricum*, male (M. Bedjanič); lower small: *Ceriagrion coromandelianum*, male (M. Bedjanič); p. 80: habitat (K. Conniff);

SPECIES ACCOUNTS — p. 81: *Onychargia atrocyana*, male (G. van der Poorten); p. 82: *Agriocnemis femina*, female (K. Conniff); p. 83: *Agriocnemis pygmaea*, mating wheel - copulation (K. Conniff); p. 84: upper: *Mortonagrion ceylonicum*, male (K. Conniff); p. 84: lower: *Mortonagrion ceylonicum*, female (K. Conniff); p. 86: *Paracercion malayanum*, male (G. van der Poorten); p. 87: *Aciagrion occidentale*, male (G. van der Poorten); p. 88: *Ischnura aurora rubilio*, male (K. Conniff); p. 89: *Ischnura senegalensis*, male (K. Conniff); p. 90: *Amphiallagma parvum*, male, India (A. Brandon); p. 91: *Ceriagrion cerinorubellum*, male (K. Conniff); p. 92: *Ceriagrion coromandelianum*, male (K. Conniff); p. 93: *Pseudagrion decorum*, male (A. Brandon); p. 94: *Pseudagrion malabaricum*, male (K. Conniff); p. 95: *Pseudagrion microcephalum*, male (G. van der Poorten); p. 96: upper: *Pseudagrion rubriceps ceylonicum*, male (M. Bedjanič); p. 96: lower: *Pseudagrion rubriceps ceylonicum*, oviposition in tandem (M. Bedjanič); p. 98: upper: *Archibasis lieftincki*, male (M. Bedjanič); p. 98: lower: *Archibasis lieftincki*, female (M. Bedjanič); p. 100: upper: *Archibasis oscillans hanwellanensis*, male (K. Conniff); p. 100: lower: *Archibasis oscillans hanwellanensis*, female (K. Conniff);



Onychargia atrocyana, young male
(G. van der Poorten)



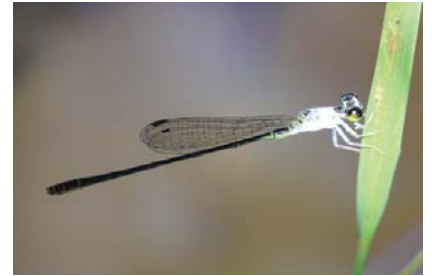
Agriocnemis femina, male
(K. Conniff)



Onychargia atrocyana, young female
(G. van der Poorten)



Paracercion malayanum, female
(G. van der Poorten)



Aciagrion occidentale, young male
(G. van der Poorten)



Aciagrion occidentale, female
(G. van der Poorten)



Ceriagrion cerinorubellum, female
(K. Conniff)



Ceriagrion coromandelianum,
female (K. Conniff)



Agriocnemis pygmaea, upper two: young
male and pruinosed male (K. Conniff);
lower three: different colour forms of
females (G. van der Poorten, upper,
middle; K. Conniff, lower)



Ischnura aurora rubilio, male and female in tandem (M. Bedjanič)



Ischnura senegalensis, male with blue sides of thorax (G. van der Poorten)



Pseudagrion decorum, male and female in tandem, India (A. Brandon)



Pseudagrion malabaricum, upper: young male; lower: female (G. van der Poorten)



Pseudagrion microcephalum, upper: young male; lower: female (G. van der Poorten)



Pseudagrion malabaricum, upper: young male; lower: female (G. van der Poorten)

PLATYCNEMIDIDAE

FAMILY INTRODUCTION PAGES - p. 102: habitat (K. Conniff); p. 103, top: *Copera marginipes*, male (M. Bedjanič); upper small: *Copera marginipes*, male and female in tandem (M. Bedjanič); middle small: *Copera marginipes*, juvenile male (G. van der Poorten); lower small: *Copera marginipes*, teneral female (G. van der Poorten); p. 103: habitat (M. Bedjanič);

SPECIES ACCOUNT —p. 105: *Copera marginipes*, male (K. Conniff);

PLATYSTICTIDAE

FAMILY INTRODUCTION PAGE - p. 106: habitat (M. Bedjanič); p. 107, top: *Platysticta apicalis*, ovipositing female (M. Bedjanič); left small: *Drepanosticta montana*, male (M. Bedjanič); middle small: *Drepanosticta mojca*, male (K. Conniff); lower small: *Drepanosticta nietneri*, female (M. Bedjanič);

SPECIES ACCOUNTS – p. 108, upper: *Drepanosticta anamia*, male (M. Bedjanič); p. 108, lower: *Drepanosticta anamia*, female (M. Bedjanič); p. 110, upper: *Drepanosticta adami*, male (K. Conniff); p. 110, lower: *Drepanosticta adami*, female (M. Bedjanič); p. 112, upper: *Drepanosticta austeni*, male (M. Bedjanič); p. 112, lower: *Drepanosticta austeni*, female (M. Bedjanič); p. 114, upper: *Drepanosticta bine*, male (M. Bedjanič); p. 114, lower: *Drepanosticta bine*, female (M. Bedjanič); p. 116, upper: *Drepanosticta brincki*, male (M. Bedjanič); p. 116, lower: *Drepanosticta brincki*, female (M. Bedjanič); p. 118: *Drepanosticta digna*, male (K. Conniff); p. 120, upper: *Drepanosticta hilaris*, male (M. Bedjanič); p. 120, lower: *Drepanosticta hilaris*, female (M. Bedjanič); p. 122, upper: *Drepanosticta lankanesis*, male (M. Bedjanič); p. 122, lower: *Drepanosticta lankanensis*, female (M. Bedjanič); p. 124, upper: *Drepanosticta mojca*, male (M. Bedjanič); p. 124, lower: *Drepanosticta mojca*, female (K. Conniff); p. 126, upper: *Drepanosticta montana*, male (M. Bedjanič); p. 126, lower: *Drepanosticta montana*, female (M. Bedjanič); p. 128, upper: *Drepanosticta nietneri*, male (M. Bedjanič); p. 128, lower: *Drepanosticta nietneri*, female (M. Bedjanič); p. 130, upper: *Drepanosticta submontana*, male (M. Bedjanič); p. 130, lower: *Drepanosticta submontana*, female (M. Bedjanič); p. 132: *Drepanosticta subtropica*, male, lectotype, Natural History Museum London, UK (M. Bedjanič); p. 134, upper: *Drepanosticta tropica*, male (M. Bedjanič); p. 134, lower: *Drepanosticta tropica*, female (M. Bedjanič); p. 136, upper: *Drepanosticta walli*, male (M. Bedjanič); p. 136, lower: *Drepanosticta walli*, female (M. Bedjanič); p. 138: *Drepanosticta* sp. nov. A, male (K. Conniff); p. 139: *Drepanosticta* sp. nov. B, male (M. Bedjanič); p. 140, upper: *Platysticta apicalis*, male (M. Bedjanič); p. 140, lower: *Platysticta apicalis*, female (M. Bedjanič); p. 142, upper: *Platysticta maculata*, male (M. Bedjanič); p. 142, lower: *Platysticta maculata*, female (M. Bedjanič); p. 144: *Platysticta* sp. nov. A, male (M. Bedjanič); p. 145: *Platysticta* sp. nov. B, male (M. Bedjanič);

PROTONEURIDAE

FAMILY INTRODUCTION PAGES - p. 146: habitat (M. Bedjanič); p. 147, top: *Elattonura tenax*, male (M. Bedjanič); left small: *Elattonura oculata*, male and female in tandem (M. Bedjanič); upper right small: *Elattonura caesia*, young male (M. Bedjanič); lower right small: *Elattonura centralis*, male (M. Bedjanič);

SPECIES ACCOUNTS – p. 148, upper: *Elattonura caesia*, male (K. Conniff); p. 148, lower: *Elattonura caesia*, female (K. Conniff); p. 150, upper: *Elattonura centralis*, male (K. Conniff); p. 150, lower: *Elattonura centralis*, female (G. de Silva Wijeyeratne); p. 152, upper: *Elattonura leucostigma*, male (M. Bedjanič); p. 152, lower: *Elattonura leucostigma*, female (M. Bedjanič); p. 154, upper: *Elattonura oculata*, male (M. Bedjanič); p. 154, lower: *Elattonura oculata*, male and female in tandem (M. Bedjanič); p. 156, upper: *Elattonura tenax*, male (K. Conniff); p. 156, lower: *Elattonura tenax*, oviposition in tandem (K. Conniff); p. 158, upper: *Prodasineura sita*, male (M. Bedjanič); p. 158, lower: *Prodasineura sita*, young female (K. Conniff);

AESHNIDAE

FAMILY INTRODUCTION PAGES - p. 160: habitat (M. Bedjanič); p. 161, top: *Gynacantha dravida*, old female (M. Bedjanič); upper small: *Anax immaculifrons*, male (M. Bedjanič); middle small: *Anax indicus*, male (M. Bedjanič); right small: *Anaciaeschna donaldi*, young female (K. Conniff); p. 161: habitat (M. Bedjanič);

SPECIES ACCOUNTS – p. 163: *Anaciaeschna donaldi*, young female (K. Conniff); p. 164: *Anax ephippiger*, male, Slovenia (M. Bedjanič); p. 165: *Anax guttatus*, female (G. van der Poorten); p. 166: *Anax immaculifrons*, male (G. van der Poorten); p. 167: *Anax indicus*, female (G. van der Poorten); p. 168: *Anax tristis*, male, Naturalis Biodiversity Center, Leiden, The Netherlands (M. Bedjanič); p. 169: *Gynacantha dravida*, male, (G. van der Poorten);



Anaciaeschna donaldi, teneral male (M. Bedjanič)



Anax immaculifrons, ovipositing female (G. van der Poorten)



Anax indicus, male (G. van der Poorten)



Gynacantha dravida, young female (G. van der Poorten)

GOMPHIDAE

FAMILY INTRODUCTION PAGES - p. 170: habitat (M. Bedjanič); p. 171, top: *Megalogomphus ceylonicus*, male (M. Bedjanič); left small: *Heliogomphus walli*, male (M. Bedjanič); middle small: *Macrogomphus lankanensis*, exuvia (M. Bedjanič); right small: *Paragomphus henryi*, male (M. Bedjanič);

SPECIES ACCOUNTS – p. 172, upper: *Anisogomphus ceylonicus*, teneral male, holotype of *A. solitarius*, Museum of Zoology, Lund University, Sweden (M. Bedjanič); p. 172, lower: *Anisogomphus ceylonicus*, female, holotype (G. van der Poorten; Credit to Museum of Comparative Zoology, Harvard University; © President and Fellows of Harvard College); p. 174, upper: *Burmagomphus pyramidalis sinuatus*, male (M. Bedjanič); p. 174, lower: *Burmagomphus pyramidalis sinuatus*, female (M. Bedjanič); p. 176, upper: *Cyclogomphus gynostylus*, male (K. Conniff); p. 176, lower: *Cyclogomphus gynostylus*, female (M. Bedjanič); p. 178, upper: *Heliogomphus lyratus*, male (M. Bedjanič); p. 178, lower: *Heliogomphus lyratus*, female (M. Bedjanič); p. 180, upper: *Heliogomphus nietneri*, male (G. van der Poorten); p. 180, lower: *Heliogomphus nietneri*, female (G. van der Poorten); p. 182, upper: *Heliogomphus walli*, male (M. Bedjanič); p. 182, lower: *Heliogomphus walli*, female (M. Bedjanič); p. 184, both photos: *Macrogomphus annulatus keiseri*, male, holotype, Natural History Museum Basel, Switzerland (M. Bedjanič); p. 186, upper: *Macrogomphus lankanensis*, male (M. Bedjanič); p. 186, lower: *Macrogomphus lankanensis*, female (G. van der Poorten); p. 188, both photos: *Microgomphus wijaya*, male (M. Bedjanič); p. 190, upper: *Megalogomphus ceylonicus*, male (M. Bedjanič); p. 190, lower: *Megalogomphus ceylonicus*, female (G. van der Poorten); p. 192, upper: *Paragomphus henryi*, male (M. Bedjanič); p. 192, lower: *Paragomphus henryi*, female (K. Conniff); p. 194, upper: *Paragomphus campestris*, male (K. Conniff); p. 194, lower: *Paragomphus campestris*, teneral female (M. Bedjanič); p. 196, upper: *Gomphidia pearsoni*, male (M. Bedjanič); p. 196, lower: *Gomphidia pearsoni*, exuvia (M. Bedjanič); p. 198: *Ictinogomphus rapax*, male (M. Bedjanič); p. 199: habitat (M. Bedjanič);



Burmagomphus pyramidalis sinuatus, emergence - female and its exuvia (M. Bedjanič)



Cyclogomphus gynostylus, emergence - male and its exuvia (K. Conniff)



Megalogomphus ceylonicus, exuvia (M. Bedjanič)



Ictinogomphus rapax, female (K. Conniff)

CORDULIIDAE

FAMILY INTRODUCTION PAGES - p. 200: habitat (M. Bedjanič); p. 201, top: *Macromia zeylanica*, male (K. Conniff); left small: *Macromia zeylanica*, male (M. Bedjanič); middle small: *Epophthalmia vittata cyanocephala*, exuvia (K. Conniff); right small: *Epophthalmia vittata cyanocephala*, male (K. Conniff);

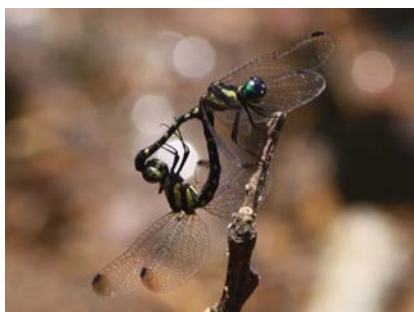
SPECIES ACCOUNTS – p. 202, upper: *Epophthalmia vittata cyanocephala*, male (G. van der Poorten); p. 202, lower: *Epophthalmia vittata cyanocephala*, female (G. de Silva Wijeyeratne); p. 204, both photos: *Macromia flinti*, male, holotype, National Museum of Natural History, Smithsonian Institution, Washington, USA (J. Louton); p. 206, upper: *Macromia zeylanica*, male (K. Conniff); p. 206, lower: *Macromia zeylanica*, female (K. Conniff); p. 208, upper: *Macromidia donaldi pethiyagodai*, male (G. van der Poorten); p. 208, lower: *Macromidia donaldi pethiyagodai*, female (G. van der Poorten);

LIBELLULIDAE

FAMILY INTRODUCTION PAGES: p. 210: habitat (M. Bedjanič); p. 211, top: *Rhyothemis variegata variegata*, female (M. Bedjanič); upper small: *Aethriamanta brevipennis brevipennis*, female (M. Bedjanič); middle small: *Tetrathemis yerburii*, male (M. Bedjanič); right small: *Trithemis aurora*, male (M. Bedjanič);

SPECIES ACCOUNTS – p. 212, upper: *Hylaeothemis fruhstorferi*, male (M. Bedjanič); p. 212, lower: *Hylaeothemis fruhstorferi*, female (K. Conniff); p. 214, upper: *Tetrathemis yerburii*, male (M. Bedjanič); p. 214, lower: *Tetrathemis yerburii*, ovipositing female (K. Conniff);

p. 216: *Brachydiplax sobrina*, male (M. Bedjanič); p. 217: *Cratilla lineata calverti*, male (K. Conniff); p. 218: *Lathrecista asiatica asiatica*, young male (K. Conniff); p. 219: *Lyriothemis defonseikai*, male (G. van der Poorten); p. 220, upper: *Lyriothemis defonseikai*, male (G. van der Poorten); p. 220, lower: *Lyriothemis defonseikai*, female (G. van der Poorten); p. 222: *Orthetrum chrysis*, male (M. Bedjanič); p. 223: *Orthetrum glaucum*, mating wheel - copulation (M. Bedjanič); p. 224: *Orthetrum luzonicum*, male (M. Bedjanič); p. 225: *Orthetrum prunosum neglectum*, mating wheel - copulation (M. Bedjanič); p. 226: *Orthetrum sabina sabina*, mating wheel - copulation (K. Conniff); p. 227: *Orthetrum triangulare triangulare*, male (M. Bedjanič); p. 228: *Potamarcha congener*, male (M. Bedjanič); p. 229: *Acisoma panorpoides*, male (M. Bedjanič); p. 230: *Brachythemis contaminata*, male (M. Bedjanič); p. 231: *Bradinopyga geminata*, female (M. Bedjanič); p. 232: *Crocothemis servilia servilia*, male (K. Conniff); p. 233: *Diplacodes nebulosa*, male (K. Conniff); p. 234: *Diplacodes trivialis*, male (K. Conniff); p. 235: *Indothemis carnatica*, male (K. Conniff); p. 236: *Indothemis limbata sita*, male (K. Conniff); p. 237: *Neurothemis intermedia intermedia*, male (K. Conniff); p. 238: *Neurothemis tullia tullia*, male (K. Conniff); p. 239: *Rhodothemis rufa*, male (K. Conniff); p. 240: *Sympetrum fonscolombii*, male (K. Conniff); p. 241: *Trithemis aurora*, male (K. Conniff); p. 242: *Trithemis festiva*, male (K. Conniff); p. 243: *Trithemis pallidinervis*, male (K. Conniff); p. 244: *Onychothemis testacea ceylanica*, male (M. Bedjanič); p. 245: *Rhyothemis triangularis*, male (K. Conniff); p. 246: *Rhyothemis variegata variegata*, male (K. Conniff); p. 247: *Hydrobasileus croceus*, young male (M. Bedjanič); p. 248: *Pantala flavescens*, male (K. Conniff); p. 249: *Tramea basilaris burmeisteri*, male (G. van der Poorten); p. 250: *Tramea limbata*, male (G. van der Poorten); p. 251: *Tholymis tillarga*, male (K. Conniff); p. 252: *Zyxomma petiolatum*, male (K. Conniff); p. 253: *Aethriamanta brevipennis brevipennis*, male (K. Conniff); p. 254: *Macrodiplax cora*, male (G. van der Poorten); p. 255: *Urothemis signata signata*, male (K. Conniff); p. 256, upper: *Zygonyx iris ceylonicus*, male (M. Bedjanič); p. 256, lower: *Zygonyx iris ceylonicus*, oviposition in tandem (M. Bedjanič);



Tetrathemis yerburii, mating wheel – copulation, male with clear wing tips (K. Conniff)



Brachydiplax sobrina, female (G. van der Poorten)



Cratilla lineata calverti, female (K. Conniff)



Lathrecista asiatica asiatica, female (G. van der Poorten)



Orthetrum glaucum, young male (G. van der Poorten)



Orthetrum glaucum, old female (G. van der Poorten)



Orthetrum glaucum, female (G. van der Poorten)



Orthetrum chrysis, mating wheel - copulation, (G. van der Poorten)



Orthetrum luzonicum, female
(G. van der Poorten)



Orthetrum luzonicum, young male
(G. van der Poorten)



Orthetrum pruinosum neglectum,
female (G. van der Poorten)



Orthetrum luzonicum, old female
(G. van der Poorten)



Orthetrum luzonicum, young male
(G. van der Poorten)



Orthetrum pruinosum neglectum,
young male (M. Bedjanič)



Orthetrum triangulare triangulare,
female (G. van der Poorten)



Potamarcha congener,
female (G. van der Poorten)



Acisoma panorpoides,
female (G. van der Poorten)



Brachythemis contaminata,
female (G. van der Poorten)



Crocothemis servilia servilia,
young male (G. van der Poorten)



Crocothemis servilia servilia, androchrome
female (G. van der Poorten)



Diplacodes nebulosa, female
(G. van der Poorten)



Diplacodes trivialis, female
(G. van der Poorten)



Bradinopyga geminata, male
(M. Bedjanič)



Indothemis carnatica, female
(G. van der Poorten)



Indothemis limbata sita, female
(G. van der Poorten)



Rhodothemis rufa, young male
(G. van der Poorten)



Neurothemis tullia tullia, young male
(M. Bedjanič)



Neurothemis tullia tullia,
female (G. van der Poorten)



Rhodothemis rufa, female
(G. van der Poorten)



Neurothemis intermedia intermedia,
female (G. van der Poorten)



Sympetrum fonscolombii, female
(G. van der Poorten)



Onychothemis testacea ceylanica,
freshly emerged female with exuvia
(M. Bedjanič)



Trithemis aurora, female
(G. van der Poorten)



Trithemis aurora, young male
(G. van der Poorten)



Trithemis aurora, young male
(G. van der Poorten)



Trithemis festiva, female
(G. van der Poorten)



Trithemis festiva, young male
(M. Bedjanič)



Trithemis pallidinervis, female
(K. Conniff)



Rhyothemis variegata variegata,
female (M. Bedjanič)



Hydrobasileus croceus, female
(K. Conniff)



Pantala flavescens, female
(G. van der Poorten)



Tramea basilaris burmeisteri, female
(G. van der Poorten)



Tramea limbata, female
(G. van der Poorten)



Tholymis tillarga, female
(G. van der Poorten)



Zyxomma petiolatum, female
(K. Conniff)



Aethriamanta brevipennis brevipennis,
female (G. van der Poorten)



Aethriamanta brevipennis brevipennis,
young male (G. van der Poorten)



Macrodiplax cora, female
(G. van der Poorten)



Urothemis signata signata, female
(G. van der Poorten)



Zygonyx iris ceylonicus, exuvia
(M. Bedjanič)

- Chapter 9 – p. 273, *Platysticta maculata*, male (M. Bedjanič)

INDEX

Aciagrion occidentale

20, 31, 43, **87**, 285, 308, 309

Acisoma panorpoides

20, 21, 33, 43, **229**, 289, 313, 314

Aethriamanta brevipennis brevipennis

23-24, 33, 43, 211, **253**, 290, 312, 313, 317

Agriocnemis femina

31, 43, **82**, 83, 285, 308, 309

Agriocnemis pygmaea

21, 31, 43, 82, **83**, 91, 285, 306, 308, 309

Amphiallagma parvum

31, 42, 43, 86, **90**, 286, 308

Anaciaeschna donaldi

32, 43, 161, **163**, 287, 311

Anax ephippiger

32, 42, 43, **164**, 287, 311

Anax guttatus

20, 32, 43, **165**, 167, 287, 311

Anax immaculifrons

32, 43, 161, **166**, 287, 311

Anax indicus

20, 21, 32, 43, 161, 165, **167**, 287, 311

Anax tristis

32, 42, 43, 44, **168**, 287, 311

Anisogomphus ceylonicus

27, 28, 30, 32, 42, 43, 45, **172-173**, 261, 263, 288, 300, 312

Archibasis lieftincki

23, 28, 30, 31, 43, **98-99**, 260, 263, 286, 294, 308

Archibasis oscillans hanwellanensis

28, 30, 31, 43, 98, **100-101**, 260, 263, 286, 294, 308

Brachydiplax sobrina

20, 21, 32, 43, **216**, 288, 312

Brachythemis contaminata

20, 21, 23, 33, 43, **230**, 289, 313, 314

Bradinopyga geminata

21, 33, 43, **231**, 289, 313, 315

Burmagomphus pyramidalis sinuatus

17, 23, 27, 28, 32, 43, **174-175**, 262, 263, 288, 301, 312

Ceriagrion cerinorubellum

21, 31, 43, **91**, 286, 308, 309

Ceriagrion coromandelianum

20, 21, 31, 43, 79, **92**, 286, 308, 309

Copera marginipes

22, 31, 43, 103, **105**, 286, 310

Cratilla lineata calverti

23, 32, 43, **217**, 289, 312

Crocothemis servilia servilia

20, 21, 33, 43, **232**, 289, 313, 314

Cyclogomphus gynostylus

21, 22, 27, 32, 43, **176-177**, 262, 263, 288, 301, 312

Diplacodes nebulosa

33, 43, **233**, 289, 313, 315

Diplacodes trivialis

23, 33, 43, **234**, 289, 313, 315

Drepanosticta anamia

28, 30, 31, 43, **108-109**, 260, 263, 286, 294, 311

Drepanosticta adami

27, 31, 43, **110-111**, 261, 263, 286, 295, 311

Drepanosticta austeni

22, 28, 31, 43, **112-113**, 116, 118, 139, 261, 263, 286, 295, 311

Drepanosticta bine

28, 30, 31, 43, **114-115**, 261, 263, 286, 295-296, 311

Drepanosticta brincki

22, 28, 31, 43, 112, 114, **116-117**, 139, 261, 263, 286, 311

Drepanosticta digna

27, 31, 43, 112, 116, **118-119**, 128, 139, 261, 263, 286, 296, 311

Drepanosticta hiliaris

19, 27, 31, 43, **120-121**, 261, 263, 286, 296, 311

Drepanosticta lankanensis

22, 27, 28, 30, 31, 43, 114, **122-123**, 124, 136, 261, 263, 286, 311

- Drepanosticta mojca*
28, 30, 31, 43, 107, **124-125**, 132, 134, 138, 261, 263, 286, 296, 311
- Drepanosticta montana*
22, 27, 31, 43, 107, 114, **126-127**, 130, 261, 263, 286, 296, 311
- Drepanosticta nietneri*
27, 31, 43, 107, 112, 116, **128-129**, 261, 263, 287, 297, 311
- Drepanosticta* sp. nov. A
31, 43, 124, 132, 134, **138**, 287, 311
- Drepanosticta* sp. nov. B
31, 43, **139**, 287, 311
- Drepanosticta submontana*
22, 27, 28, 30, 31, 43, 114, 126, **130-131**, 261, 263, 287, 297, 311
- Drepanosticta subtropica*
27, 31, 42, 43, 45, 124, **132-133**, 134, 261, 263, 287, 297, 311
- Drepanosticta tropica*
27, 31, 43, 124, **134-135**, 261, 263, 287, 297, 311
- Drepanosticta walli*
27, 31, 43, **136-137**, 261, 263, 287, 298, 311
- Elattoneura caesia*
22, 23, 27, 28, 32, 43, 147, **148-149**, 150, 261, 263, 287, 311
- Elattoneura centralis*
22, 23, 27, 28, 32, 43, 147, 148, **150-151**, 261, 263, 287, 311
- Elattoneura leucostigma*
22, 27, 28, 30, 32, 43, **152-153**, 261, 263, 287, 299, 311
- Elattoneura oculata*
22, 23, 27, 28, 30, 32, 43, 147, **154-155**, 261, 263, 287, 299-300, 311
- Elattoneura tenax*
22, 27, 32, 43, 147, **156-157**, 261, 263, 287, 300, 311
- Epophthalmia vittata cyanocephala*
20, 21, 27, 28, 32, 43, 201, **202-203**, 262, 263, 288, 312
- Euphaea splendens*
22, 27, 31, 43, 50, 63, **64-65**, 260, 263, 285, 308
- Gomphidia pearsoni*
22, 23, 27, 32, 43, **196-197**, 262, 263, 288, 303-304, 312
- Gynacantha dravida*
23, 32, 43, 161, **169**, 287, 311
- Heliogomphus lyratus*
27, 32, 43, **178-179**, 262, 263, 288, 301, 312
- Heliogomphus nietneri*
22, 27, 32, 43, **180-181**, 262, 263, 288, 301-302, 312
- Heliogomphus walli*
22, 23, 27, 32, 43, 171, **182-183**, 262, 263, 288, 312
- Hydrobasileus croceus*
24, 33, 43, **247**, 290, 313, 316
- Hylaeothemis fruhstorferi*
23, 27, 32, 43, **212-213**, 262, 263, 288, 304, 312
- Ictinogomphus rapax*
20, 21, 32, 43, **198**, 288, 312
- Indolestes divisus*
27, 31, 43, **74-75**, 76, 260, 263, 285, 292, 308
- Indolestes gracilis gracilis*
23, 27, 31, 43, 67, 74, **76-77**, 260, 263, 285, 292-293, 308
- Indothemis carnatica*
20, 33, 43, **235**, 289, 313, 315
- Indothemis limbata sita*
20, 33, 43, **236**, 242, 289, 313, 315
- Ischnura aurora rubilio*
31, 43, 79, **88**, 285, 308, 310
- Ischnura senegalensis*
31, 43, **89**, 286, 306, 308, 310
- Lathrecista asiatica asiatica*
23, 32, 43, **218**, 289, 312, 313
- Lestes elatus*
20, 21, 31, 43, 67, **69**, 70, 285, 308
- Lestes malabaricus*
31, 42, 43, **70**, 285, 308
- Lestes praemorsus decipiens*
20, 21, 31, 43, 67, 70, **71**, 285, 308
- Libellago adami*
9, 21, 22, 28, 31, 43, **54-55**, 58, 260, 263, 285, 307
- Libellago corbeti*
28, 31, 43, 53, **56-57**, 260, 263, 285, 292, 307
- Libellago finalis*
22, 27, 31, 43, 53, 54, **58-59**, 260, 263, 285, 307
- Libellago greeni*
23, 27, 31, 43, 53, **60-61**, 260, 263, 285, 307
- Lyriothemis defonseikai*
23, 28, 30, 32, 43, 219, **220-221**, 262, 263, 289, 305, 313
- Macrodiplax cora*
23, 33, 43, **254**, 290, 313, 317
- Macrogomphus annulatus keiseri*
28, 32, 42, 43, 45, **184-185**, 262, 263, 288, 302, 312
- Macrogomphus lankanensis*
22, 23, 27, 32, 43, 171, **186-187**, 262, 263, 288, 302, 312
- Macromia flinti*
28, 32, 42, 43, 45, **204-205**, 206, 262, 263, 288, 304, 312
- Macromia zeylanica*
22, 23, 27, 28, 32, 43, 201, 204, **206-207**, 262, 263, 288, 304, 312
- Macromidia donaldi pethiyagodai*
28, 30, 32, 43, **208-209**, 262, 263, 288, 304, 312
- Megalogomphus ceylonicus*
27, 32, 43, 171, **190-191**, 262, 263, 288, 303, 312
- Microgomphus wijaya*
22, 28, 32, 43, **188-189**, 262, 263, 288, 302, 312

- Mortonagrion ceylonicum***
23, 28, 31, 43, 79, **84-85**, 260, 263, 285, 293-294, 308
- Neurobasis chinensis chinensis***
22, 31, 43, 47, **49**, 50, 285, 307
- Neurothemis intermedia intermedia***
21, 33, 43, **237**, 289, 313, 315
- Neurothemis tullia tullia***
21, 33, 43, **238**, 289, 313, 315
- Onychargia atrocyana***
23, 31, 43, **81**, 285, 308, 309
- Onychothemis testacea ceylanica***
22, 33, 43, **244**, 290, 313, 315
- Orthetrum chrysis***
23, 32, 43, **222**, 225, 289, 313
- Orthetrum glaucum***
32, 43, **223**, 224, 289, 313
- Orthetrum luzonicum***
32, 43, **224**, 289, 313, 314
- Orthetrum pruinatum neglectum***
32, 43, **225**, 289, 313, 314
- Orthetrum sabina sabina***
21, 32, 43, **226**, 289, 313
- Orthetrum triangulare triangulare***
23, 32, 43, **227**, 289, 313, 314
- Pantala flavescens***
21, 24, 33, 43, **248**, 290, 313, 316
- Paracercion malayanum***
20, 21, 31, 43, **86**, 90, 285, 308, 309
- Paragomphus campestris***
28, 30, 32, 43, **194-195**, 262, 263, 288, 303, 312
- Paragomphus henryi***
22, 27, 28, 32, 43, 171, **192-193**, 194, 262, 263, 288, 312
- Platysticta apicalis***
22, 27, 32, 43, 107, **140-141**, 145, 261, 263, 287, 311
- Platysticta maculata***
22, 27, 32, 43, 140, **142-143**, 144, 261, 263, 273, 287, 298-299, 311, 317
- Platysticta sp. nov. A***
32, 43, **144**, 287, 311
- Platysticta sp. nov. B***
32, 43, **145**, 287, 311
- Potamarcha congener***
32, 43, **228**, 289, 313, 314
- Prodasineura sita***
21, 22, 23, 27, 32, 43, **158-159**, 261, 263, 287, 311
- Pseudagrion decorum***
31, 43, **93**, 286, 308, 310
- Pseudagrion malabaricum***
20, 21, 31, 43, 79, **94**, 95, 286, 308, 310
- Pseudagrion microcephalum***
20, 21, 31, 43, 94, **95**, 286, 308, 310
- Pseudagrion rubriceps ceylonicum***
16, 21, 22, 27, 31, 43, **96-97**, 260, 263, 286, 308
- Rhodothemis rufa***
20, 21, 33, 43, **239**, 289, 313, 315
- Rhyothemis triangularis***
16, 33, 43, **245**, 290, 313
- Rhyothemis variegata variegata***
21, 33, 43, 211, **246**, 290, 312, 313, 316
- Sinhalestes orientalis***
22, 24, 27, 31, 43, 67, **72-73**, 260, 263, 285, 292, 308
- Sympetrum fonscolombii***
23, 33, 43, **240**, 290, 313, 315
- Tetrathemis yerburii***
27, 32, 43, 211, **214-215**, 262, 263, 288, 305, 312
- Tholymis tillarga***
33, 43, **251**, 290, 313, 316
- Tremea basilaris burmeisteri***
24, 33, 43, **249**, 290, 313, 316
- Tremea limbata***
33, 43, **250**, 290, 313, 316
- Trithemis aurora***
20, 21, 33, 43, 211, **241**, 290, 312, 313, 316
- Trithemis festiva***
22, 33, 43, **242**, 290, 313, 316
- Trithemis pallidinervis***
23, 33, 43, **243**, 290, 313, 316
- Urothemis signata signata***
24, 33, 43, **255**, 290, 313, 317
- Vestalis apicalis nigrescens***
22, 27, 31, 43, 47, **50-51**, 260, 263, 285, 307
- Zygonyx iris ceylonicus***
22, 27, 28, 33, 43, **256-257**, 262, 263, 290, 313, 317
- Zyxomma petiolatum***
33, 43, **252**, 290, 313, 317



Matjaž Bedjanič

Matjaž comes from a small European country—Slovenia. His interest and research on the dragonfly fauna of Sri Lanka started with a graduation thesis almost two decades ago and is continuing in the frame of an evergreen PhD study on the topic. Matjaž has authored numerous articles on the dragonfly fauna of Slovenia, the Balkans and Sri Lanka and is a co-author of the photographic guide *Dragonflies of Sri Lanka*. He has professional experience in nature conservation, formerly employed at the Slovenian Environment Agency and the Institute of the Republic of Slovenia for Nature Conservation. His main free time interests include taxonomy, biology, zoogeography, conservation of dragonfly fauna and freshwater ecosystems, fieldwork and nature photography. He is a member of the IUCN SSC Odonata Specialist Group, covering Sri Lanka. His odonatological field experience in Southeast Asia comprises Sri Lanka, South India, Indonesia, Hong Kong, China and Japan.



Karen Conniff

Karen Conniff has a PhD in Agriculture from Colorado State University; she has also studied entomology formally and informally since her degree. After having lived in Lesotho, Botswana, Egypt, Nepal, and Sri Lanka, she worked in Asia and Africa on issues of sustainable farming and water management. In 2000 she began photographing and learning more about dragonflies in Sri Lanka. She worked with Matjaž Bedjanič and Gehan de Silva Wijeyeratne to publish the photographic guide *Dragonflies of Sri Lanka* in 2007 and with Nancy van der Poorten to publish several species descriptions. In 2011 Karen moved to Nepal where she continues to study, photograph and enjoy dragonflies at all elevations.



Nancy van der Poorten

Nancy's first degree is in Botany but her interests in insects started as a child. She has been involved in dragonfly work in Canada and Sri Lanka since the early 1990's. She is past-president of the Toronto Entomologists' Association in Canada and a member of the Worldwide Dragonfly Association. She is also involved in studies of butterflies and moths with her husband Michael, who is just as enthusiastic about dragonflies as well and whose photography greatly enhances their field studies of life histories and behaviour. She is also keen on taxonomy, and enjoys delving into its details.



Ali Šalamun

Ali is Slovenian, a biologist, working professionally in research, surveys and environmental assessments of the dragonfly fauna of Slovenia at the Centre for Cartography of Fauna and Flora. His expertise also lies in database management, cartography and GIS. In 2001, he joined Matjaž during a one month fieldtrip to Sri Lanka and in last few years he has worked on the cartography and database management of the *Distribution Atlas of the dragonflies of Sri Lanka* project.

Dragonflies are strikingly beautiful insects and small colourful pearls of Sri Lanka's remarkable biodiversity. At present, 124 species are known from the island, of which almost half are endemic. Such an extraordinary level of endemism makes Sri Lankan dragonflies an exceptionally interesting group for studies in biodiversity, zoogeography, phylogeny and ecology.

The book “*Dragonfly fauna of Sri Lanka: distribution and biology, with threat status of its endemics*” is the result of almost 20 years of the authors' work on the subject. With detailed texts and hundreds of colour photographs, maps and charts, it summarizes all the available knowledge on the distribution, taxonomy, biology and disturbing threat status of the dragonflies of Sri Lanka. It aims to raise awareness and promote interest in odonatology among a widespread and diverse community of researchers, nature conservationists and students in Sri Lanka and abroad.

